

amateur radio

Vol. 38, No. 10

OCTOBER, 1970

Registered at G.P.O., Melbourne, for
transmission by post as a periodical

Price 30 Cents



amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910



OCTOBER, 1970

Vol. 38, No. 10

Publishers:

VICTORIAN DIVISION W.I.A.

Reg. Office: 478 Victoria Parade, East Melbourne, Vic., 3002.

Editor:

K. E. PINCOTT VK3AFJ

Assistant Editor:

E. C. Manifold VK3EM

Publications Committee:

Ken Gillespie VK3GK

Harold Hepburn (Secretary) VK3AFQ

Peter Ramsay VK3ZWN

W. E. J. Roper VK3ARZ

Circulation—

Jack Kelly VK3AFD

Draughtsmen—

Glen Allan VK3ZIV

John Bianchi VK3ZOL

John Whitehead VK3YAC

Enquiries:

Mrs. BELLAIRS, Phone 41-3535, 478 Victoria Parade, East Melbourne, Vic., 3002. Hours: 10 a.m. to 3 p.m. only.

Advertising Representatives:

TECHNICAL NEWS PUBLICATIONS

21 Smith St., Fitzroy, Vic., 3065. Tel. 41-4982.

P.O. Box 108, Fitzroy, Vic., 3065.

Advertisement material should be sent direct to the printers by the first of each month.

Hamads should be addressed to the Editor.

Printers:

"RICHMOND CHRONICLE," Phone 42-2419,

Shakespeare Street, Richmond, Vic., 3121.



All matters pertaining to "A.R." other than advertising and subscriptions, should be addressed to:

THE EDITOR,

"AMATEUR RADIO,"

P.O. BOX 36,

EAST MELBOURNE, VIC., 3002.



Members of the W.I.A. should refer all enquiries regarding delivery of "A.R." direct to their Divisional Secretary and not to "A.R." direct. Two months' notice is required before a change of mailing address can be effected. Readers should note that any change in the address of their transmitting station must, by P.M.G. regulation, be notified to the P.M.G. In the State of residence; in addition, "A.R." should also be notified. A convenient form is provided in the "Call Book".

CONTENTS

Technical Articles:—

	Page
A Heterodyne Transmitter for Six Metres	14
Another Idea for Rotating Beams	9
Keying Monitor and Band Edge Marker	13
Modifications to VK3 432 MHz. FET Converter for Operation on 576 MHz.	11
Putting the Decades to Work: A Low-Cost Counter	7
Resonance	8

General:—

A.M.S.A.T. Hosts Distinguished Guests	12
Correspondence	22
Darwin Radio Club	20
DX	21
Extracts from "The Calendar" of International Amateur Radio Union	18
Federal Comment	6
Going to Washington?	19
New Call Signs	17
New Equipment	17
New N.Z.A.R.T. Award—5 x 5	13
Obituary	17
Overseas Magazine Review	20
Prediction Charts for October 1970	16
Silent Keys	25
Some Day	13
The Growth of Radio Communications in Australia	16
VHF	24
13th Jamboree-on-the-Air	16

Contests:—

Contest Calendar	15
"CQ" W.W. DX Contest	15

COVER STORY

This month we depict the latest piece of equipment made available through Bail Electronic Services, Australian agents for Yaesu Musen Co. Ltd., Japan. It is the Yaesu FT-101 solid-state transceiver, designed particularly for mobile use, but will be found ideal for fixed or base operation. It ranges from 80 down to 10 metres, operates from in-built power source, either 12 volts d.c., or 100, 117, 200, 220, 240 volts a.c., and weighs only 30 lbs. A four-page, technical brochure is available on request.



Bring in
the whole
wide world

REALISTICALLY

with the

REALISTIC DX 150
Communications Receiver

SW/CW/SSB/AM



Transistorised.
All solid-
state

4 Bands
.535 to 30 MHz
(includes Broadcast)

240V AC
or 12V DC
operation

This is the BIG performance set that obsoletes tube receivers . . . a professional-looking set that appeals to amateurs and short wave listeners alike. The DX 150 gives long-range, world-wide realistic reception on 4 bands, including Broadcast. Fully transistorised—all solid state—no warm-up delays; the DX 150 will run on dry cells if current fails or is not available; will operate from a car's cigarette lighter or any 12V DC service. A 240V AC power supply is also built in. Over 30 semi-conductors—product detector for SSB/CW, plus fast and slow AVC—variable pitch BFO—illuminated electrical bandspread, fully calibrated for amateur bands—cas-cade RF stage—ANL for RF and AF—zener stabilised—OTL audio—illuminated "S" meter—built-in monitor speaker plus front panel jack for external (optional) matching speaker.

CONSULT YOUR LOCAL RADIO DEALER, OR

MAIL THIS COUPON *today*

Please forward free illustrated literature and specifications on Realistic.

Name

Address

Realistic Performance
Realistic Price

\$229.50

Attractive silver extruded front panel, solid metal knobs, grey metal cabinet, size 14 1/2" x 9 1/2" x 6 1/2".



(A unit of Jacoby Mitchell Holdings Ltd.)
376 EASTERN VALLEY WAY, ROSEVILLE. 2069.
Cables and Telegraphic Address: "WESTELEC",
Sydney. Phone: 40 1212

LOW DRIFT CRYSTALS

★

1.6 Mc. to 10 Mc.,
0.005% Tolerance, \$5

★

10 Mc. to 18 Mc.,
0.005% Tolerance, \$6

★

Regrinds \$3

THESE PRICES ARE SUBJECT
TO SALES TAX

SPECIAL CRYSTALS:
PRICES
ON APPLICATION

MAXWELL HOWDEN

15 CLAREMONT CRES.,
CANTERBURY,
VIC., 3126

Phone 83-5090

LOG BOOK

AVAILABLE IN TWO TYPES—
VERTICAL OR HORIZONTAL

Larger, spiral-bound pages
with more writing space.

Price 75c each

plus 17 Cents Post and Wrapping

Obtainable from your Divisional Secretary,
or W.I.A., P.O. Box 36, East Melbourne,
Vic., 3002

COMMUNICATIONS CAREER

TRAINEES WANTED

The Department of Civil Aviation wants men aged at least 18 and under 36 years having previous telecommunications experience to undertake conversion training for positions of Communications Officer.

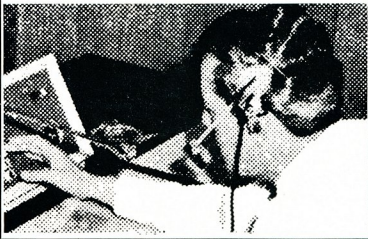
Communications Officers are responsible for the operation of Aeronautical Broadcast Services and a variety of Aeronautical Fixed Telecommunications channels linking Flight Service and Air Traffic Control units, and as such they make a vital contribution to the high safety standards of Australian civil aviation.

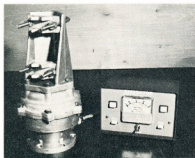
Opportunities exist for further training and advancement as Flight Service Officer.

Applicants must be British subjects (by birth or naturalisation) and be medically fit. A good level of secondary education is desirable. A minimum of two years related experience in telecommunications fields is necessary together with proficiency in machine and wireless telegraphy. Ability to communicate fluently and clearly in English is essential.

For further information contact —

Recruitment Officer,
Department of Civil Aviation,
Aviation House,
188 Queen Street,
Melbourne, VIC. 3000
Telephone 620131





BEAM ROTATOR EMOTATOR MODEL 1100M

**YOU CAN CONTROL THE DIRECTION OF YOUR BEAM ANTENNA
FROM YOUR OPERATING POSITION**

The heavy duty model 1100M features rugged cast aluminium construction, stainless steel bolts, nuts and washers. Bearing design with 90-ball bearing provides high vertical carrying capacity, and resistance to bending pressures due to unbalanced weight, wind, etc. Limit switches prevent over-run. Positive braking with solenoid operated double plunger, operates when drive paddle is released. Steel gears transmit drive from a fractional horse-power motor.

The 1100M can be mounted on a fixed tubular mast if an additional clamp assembly is bolted to the base. Otherwise, the rotator is base mounted on a flat plate fixed to the top of the mast or tower. Six mounting holes are provided. The antenna boom is supported on a short vertical tube held by the top clamp assembly. Clamp assemblies are of sturdy construction and clamp blocks are reversible for small or large tube within the range 1 1/4" to 2 1/4" diameter. U bolts are stainless steel 9 mm. diam.

The Indicator-Control Box is attractively finished in grey, with large illuminated meter, indicator lights, power switch, and "Left-Right" controls. Transformer is within Control Box. Control Box size: 5 1/2" x 8 3/8" x 4"; weight 8 1/2 lbs.

1100M with Indicator-Control Box and bottom mast clamp, **\$165.00.**

1100M with Indicator-Control Box (less bottom mast clamp), **\$148.50.**

Special 7-conductor Cable for 1100M, **60 cents per yard.**

All prices include Sales Tax. Freight is extra.

Main specifications of Rotator:

Electric power source: 230V. AC, 50/60 Hertz.

Torque: 400 Kg/cm.

Time for one revolution: 60 seconds, approx.

Brake system: Electro-magnetic double plunger

lock-in.

Brake power: 5,000 Kg/cm.

Vertical load: Dead weight, 500 Kg.; nominal load,

70 Kg.

Max. diameter: 1 1/4 to 2 1/4 inches.

Approx. size: height, 13 3/4 in.; base diam., 5 1/4 in.;

rotation diam., 7 3/4 in.

Specifications and Prices subject to change.

AUSTRALIAN AGENT:

BAIL ELECTRONIC SERVICES

60 SHANNON ST., BOX HILL NORTH,
VIC., 3129. Phone 89-2213

N.S.W. Rep.: MOSMAN RADIO SERVICES, P.O. Box 56, Mascot, N.S.W., 2020.

Telephone 67-1650

South Aust. Rep.: FARMERS RADIO PTY. LTD., 257 Angus St., Adelaide, S.A., 5000.

Telephone 23-1268

Western Aust. Rep.: H. R. PRIDE, 26 Lockhart Street, Como, W.A., 6152.

Telephone 60-4379

The World's Most Versatile Circuit Building System!



INSTRUCTIONS

Remove paper backing and place adhesive side downwards in the selected position. Press down firmly. When used with plain board drill from the 'Cir-Kit' side. Pass through component lead, bend over and cut to length. Solder in usual way.

When used with 'punched' board lay strip between rows of holes, pass component leads through holes adjacent to strip, bend the leads over the strip, cut to length and solder in the usual way. Alternatively lay strip over the holes and using a drawing pin or scriber prick a hole in the 'Cir-Kit' in the required position.

'Cir-Kit' strip can be bent or curved to whatever form you require and used on either or both sides of the board. When joining two pieces of 'Cir-Kit' bend over the end of the overlapping strip so that a metal to metal contact is made and solder in the usual way.

Made in the U.K.

SIZES: 1/8" and 1/16" WIDTHS

Length: 100 ft. roll, 5 ft. card

**IDEAL FOR PROTOTYPE AND PRODUCTION
CONSTRUCTION**

USEFUL FOR WIRING REPAIRS

*** NO DRILLING * FAST * NO MESS**

Available from all Leading Radio Houses

Marketed by—

ZEPHYR PRODUCTS PTY. LTD.

70 BATESFORD RD., CHADSTONE, VIC., 3148

Telephone 56-7231



**MANUFACTURERS OF RADIO
AND ELECTRICAL EQUIPMENT
AND COMPONENTS**

After Stocktaking—Surplus Stocks Below Cost

THE FOLLOWING COMPONENTS ARE SURPLUS TO OUR NORMAL REQUIREMENTS—ALL BRAND NEW

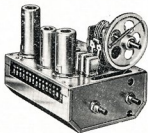
WODEN—MODERN MULTI-MATCH MODULATION TRANSFORMER



- Fully potted.
- Primary Impedance tapping range: 2,000-18,000 ohms.
- Secondary Impedance tapping range: 250-21,600 ohms.
- British made.
- Vacuum and pressure impregnated.

List No.	Audio Watts	Watts R.F. Input	Price (inc. Sales Tax)
UM0	10	10	\$6.00
UM1	30	60	\$8.00
UM2	60	120	\$12.00

GELOSO V.F.O. 4/105



80, 40, 20, 15, 10A and 10B Metre Bands

It is designed to drive a 6146 (or 807) type tube, both in AM and CW operation, under any working condition, continuous (CCS) or intermittent (ICAS).

The high stability has been achieved by means of a beat-frequency oscillator. This equipment actually mixes the output signal of a quartz-crystal generator, with the output signal of a relatively low variable frequency generator, covering a 500 KHz. range on the 80, 40, 20 and 15 metre bands, and a 1 MHz. range on the two 10 metre bands.

Price: \$11.50 (with sales tax)

WODEN—NU-METAL SHIELDED MICROPHONE TRANSFORMER



Type MT101

Single-hole mounting.

For moving coil microphones from 10 to 30 ohm impedance. Step-up ratio 50:1 overall.

Price: \$3.50

(with sales tax)

DOW-KEY R.F. RELAY

S.P.D.T. with external D.P.D.T. contacts for receiver switching or muting. R.F. rating 1 kW. V.S.W.R. less than 1.15:1 to 500 MHz. Coil voltage: 48 volts d.c.



Price reduced from \$24.00 to \$11.25 (with sales tax)

GELOSO T26 DYNAMIC MICROPHONE

WITH PRESS-TO-TALK SWITCH

As used in GELOSO G681 Tape Recorder



Switch provides external contacts for relay operation. Ideal for S.S.B. Immediately adaptable to KW2000A and similar transceivers.

Price: \$6.90 (with sales tax)

Available from . . .

R.H. Cunningham
PTY. LTD.

VIC.: 608 COLLINS STREET, MELBOURNE, 3000. Phone 61-2464

N.S.W.: 64 ALFRED STREET, MILSONS POINT, 2061. Phone 929-8066

QLD.: L. E. BOUGHEN & CO., 30 GRIMES ST., AUCHENFLOWER, 4066. Phone 7-4097

W.A.: 34 WOLYA WAY, BALGA, 6061. Phone 49-4919

The Amateur Service is probably better prepared for the 1971 Space Conference than for any previous World Administrative Radio Conference.

I have reached this conclusion after talking to the officers of National Amateur Radio Societies in many countries, including the R.S.G.B. and the A.R.R.L. Only in the course of my visit to England has the attitude of many Societies finally been expressed in words, by the formulation of a policy by the Region I. Division of I.A.R.U. I am suggesting to the Directors of the I.A.R.U. Region III. Association that the same policy be adopted for our Region, and I would hope that it would be also adopted for Region II. If so, this would then be a global policy for all of the Member Societies of the I.A.R.U. This is in itself significant.

The more that one travels meeting Radio Amateurs throughout the world, the more one realises how much the problems of Amateur Radio are common to all countries. Certainly, attitudes on some matters differ; certainly, there must be room for different views, but in relation to those matters that are basic to our hobby the aims are common throughout the world. If these common aims can be expressed in like terms to each administration then the value of an international Amateur Radio organisation is put beyond argument.

This may all sound a little unreal—that is not so. Each member country of the International Telecommunications Union (the specialised agency of the United Nations that deals with the international allocation of frequencies and the formulation of international regulations) has one vote. Therefore the Amateurs in each country should, for their own protection, ensure that their administration is favourably disposed to Amateur Radio. But it must go further than this; merely to be favourably disposed—whilst it is good—is not enough. If the Amateur Societies of the world speak with one voice and seek the same objective, then a result favourable to the Amateur Service is far more likely.

The I.A.R.U. is the international organisation of National Amateur Radio Societies; by its constitution its administration is carried on by one society—The Headquarters Society—at present the A.R.R.L. By virtue of its Constitution, the officers of the Headquarters Society take like offices in I.A.R.U. The W.I.A. strongly supports the I.A.R.U.,

so strongly in fact, that at times it seeks from the Headquarters even more than it is doing already. This is not a measure of our discontent, but an expression of our faith in the importance of the I.A.R.U.

In addition, Regional organisations have been formed in each of the three Regions. These organisations, whilst at the moment not formally recognised by the I.A.R.U. Constitution, have in fact become part of the I.A.R.U. organisation and are in the best position to deal with those matters of more local concern—for example, European v.h.f. band planning in Region I. In addition, these organisations are able to support the I.A.R.U. Headquarters in the encouragement of Amateur Radio in those countries where Amateur Radio at present is not strong. Through these Divisions of I.A.R.U., and through the I.A.R.U. has come the awareness of the need for a common aim which leads me to make my opening observation.

The Region III. organisation was formed on the initiative of the W.I.A. in Sydney at Easter 1968. It is now really only in embryonic form with the W.I.A. providing the Secretariat. I am however, completely convinced of one thing—the W.I.A. together with N.Z. A.R.T. and J.A.R.L. must be prepared to bear a heavy burden, both financially and in terms of time, to ensure that this Regional organisations is successful. The problems that face us are enormous. We have no close-knit geographically small area like Europe to provide a core around which such an organisation can grow, as was the case with the I.A.R.U. Region I. Division. We face problems of vast distance and diverse cultures throughout our Region, but these are the very things that make the success of our Regional organisation essential. Just as we must have a strong national body, we must also have a strong international body.

The problems presented by the 1971 Space Conference for the Amateur Service have certainly not yet been solved, and there is much work yet to be done both internationally and in Australia within our own national Amateur Radio society, but, if at the 1971 Conference the Amateur Service is successful in obtaining those privileges that it seeks and does not lose any of its existing privileges, then this will be in no small measure due to the co-operation and mutual understanding that exists between national Amateur Radio societies in many countries.

—MICHAEL J. OWEN, VK3KI,
Federal President, W.I.A.

ROBERT H. BLACK,* M.D., VK2OZ

RESONANCE

LECTURE NO. 8

C. A. CULLINAN,* VK3AXU

Resonance may be defined as the natural period of vibration of matter in its many forms from the smallest to the largest.

For instance, the natural period of vibration of the atom Caesium 133 is 9,192,631,770 cycles, and on the other hand that of the Empire State Building is very low. In earthquake areas, skyscrapers are designed so that their frequency will not co-incide with the average period of shock-waves generated by earthquakes. This is done to reduce the earthquake damage to a minimum since physical objects can be vibrated to destruction if sufficient power is applied to them at their resonant frequency.

The classic example is the shattering of a wine glass by a musical note whose frequency is the same as that of the glass.

In radio work, electrical resonance plays a tremendously important part and may be defined as that condition which exists in series or parallel a.c. circuits when the inductive reactance (XL) and the capacitive reactance (XC) are equal so that they balance or cancel each other, and their net effect on the circuit will be zero (i.e. their reactive effect is zero).

We have already learnt that an inductive reactance causes the current in an a.c. circuit to lag behind the voltage whilst a capacitive reactance causes the current to lead the voltage. Thus, when XL and XC have the same numerical value at a particular frequency, they cancel each other and any current flow will depend on the d.c. resistance which is present. It must be remembered that it is impossible to make any inductance or a capacitance which does not have some d.c. resistance.

Now let us remember some elementary mathematical expressions:

1. Any number multiplied by 0 (zero) = 0.
2. Any number divided by 0 (zero) = infinity ∞ .
3. Any number to which 0 (zero) is added remains unchanged.
4. Any number from which 0 (zero) is subtracted remains unchanged.

Also let us refresh our memories of the formulae for reactance:

$$XL = 2\pi fL$$

and

$$XC = 1 / 2\pi fC$$

where L and C are in Henries and Farads, respectively, and f is in cycles per second (Hz.).

An examination of these formulae shows that for any given value of L and C, as 2π is a common constant, then there will be only one value of f which will satisfy the equation $XL = XC$, and this frequency will be known as the resonant frequency for that particular value of L and C.

● Continuing the series of lectures by C. A. Cullinan, VK3AXU, at Broadcast Station 3CS for students studying for a P.M.G. Radio Operator's Certificate.

If L and C are in series, the circuit is termed as Series Resonant, and if they are in parallel then it is termed Parallel Resonant circuit. The resonant frequency can be determined by the formula:

$$f \text{ (Hz.)} = 1 / (2\pi\sqrt{LC})$$

and L and C from:

$$L \text{ (Henries)} = 1 / (4\pi^2 f^2 C)$$

and

$$C \text{ (Farads)} = 1 / (4\pi^2 f^2 L)$$

As mentioned before, the farad is a very large unit and it is more usual to use one microfarad as a reference unit, this being one millionth of a farad. The formula of the resonant frequency of an a.c. circuit then becomes,

$$f \text{ (Hz.)} = 1000 / (2\pi\sqrt{LC})$$

where L is in henries and C is in microfarads.

It should be obvious, also, from these formulae that for any given frequency there are countless combinations of L and C that will produce resonance at that frequency, but that for a given combination of L and C there can only be ONE resonant frequency.

Question: Consider a circuit in which an inductive reactance of 100 ohms is connected in series with a capacitive reactance of 100 ohms and that the circuit has a series resistance of 10 ohms. Power is supplied to the circuit at a pressure of 100 volts.

1. Find the current flowing in the circuit.
2. Find the voltage across each reactance.
3. Find the voltage across the resistance.
4. Find the power factor of the circuit.
5. Find the power in the circuit.

Comment: This question is somewhat similar to that asked earlier in our discussion on series a.c. circuits with, however, one important difference.

The question states that the two reactances have the same numerical value, therefore the circuit is series resonant and it follows that it must have unity power factor. Thus we can answer section 4 of the question without having to do any calculations, also it follows that the two reactances, together, will not consume any power, thus only the resistance will consume power. From Ohms Law ($C = E \div R$) we calculate that the current flowing in the circuit is 10 amperes and as the circuit has unity power factor, then

the power will be 100 volts \times 10 amperes = 1,000 watts, and the voltage across the resistance will be $E = C \times R = 100$ volts.

Since each reactance is stated to be 100 ohms and current has been found to be 10 amperes, then the voltage across each reactance will be $100 \times 10 = 1,000$ volts. It must be remembered that the voltage across XL will be positive and that across XC will be negative, so that in the circuit they cancel each other.

Here then are the answers to the questions:

1. 10 amperes.
2. 1,000 volts.
3. 100 volts.
4. Power factor = unity.
5. 1,000 watts.

Comment: We were not asked to find the impedance of the circuit because it should be obvious that the impedance will be the same as the resistance.

We can prove this by using the formula used to calculate the impedance of a series circuit:

$$\begin{aligned} Z &= \sqrt{R^2 + (XL - XC)^2} \\ &= \sqrt{10^2 + (100 - 100)^2} \\ &= \sqrt{10^2 + 0} \\ &= 10 \text{ ohms.} \end{aligned}$$

Now let us examine some practical applications of series resonant circuits from the writer's own experience. For obvious reasons, frequencies have been changed.

Some time ago we were engaged in designing an impedance matching network to couple a co-axial transmission line to an aerial for single frequency operation.

Measurements of the aerial made with a radio-frequency bridge had shown that it had a resistance of 52 ohms and a positive reactance of 75 ohms at the operating frequency.

The impedance of the aerial is stated by the equation:

$$Z = 50 \text{ ohms} + j75.$$

The positive sign indicates that the aerial has an inductive reactance.

Now we learnt in discussing earlier the series a.c. circuit that maximum efficiency occurs when the circuit had unity power factor. Also discussing the question on series resonance in this lecture we found that a series circuit, when resonant, has unity power factor.

Now it would be possible to couple the co-axial cable to the aerial with the aerial impedance $Z = 52 \text{ ohms} + j75$, but as the aerial would contain reactance the power factor would be less than unity so more power would have to flow into the aerial than was necessary.

Fortunately, we can "tune out" the reactance of an aerial by adding a

(continued on page 10)

ANOTHER IDEA FOR ROTATING BEAMS

KEITH F. HOFFMANN,* VK4KH

If you have a small back yard—want a rotary beam—then here is a different approach to the problem

Having obtained a prop. pitch motor and gear box to rotate the beams, the only feasible way of using it seemed to be that it would have to be mounted on an old mill tower, and the usual method adopted. This was out of the question as it would have taken up too much room in the already smallish back yard. Again, the thinking cap was put on and the idea "why not rotate the whole tower?" came to my mind. This is how I adapted the idea for my situation.

The basic components used are a galvanised 60 ft., three-section winch up tower, prop. pitch motor and gear box for rotation, and selsyn motors for remote direction indication. The tower in my case is a galvanised one which was originally used as a television survey mast on the back of a van. The two bottom sections are of triangular cross section, each section being 22 feet long. They telescope neatly inside of each other. The top section consists of a 21 ft. length of 2" diameter steel tubing which telescopes inside the other two sections. The general construction of the tower can be seen clearly in the photographs. Any person handy with a welder should have no difficulty constructing a similar tower.

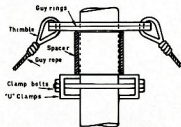


FIG. 1. GUY RING ASSEMBLY.

It is winched up and down by means of a small winch, which is built on to the tower, and 3/16" diameter steel rope. A ratchet is provided on the winch for the control of its operations. Its handle is also removable so people cannot bump into it and injure themselves. With the tower in the full-up position, the winch is locked by means of a 1/2" bolt.

The top section has a clamp made from t.v. aerial fittings fitted to it. Its purpose is to prevent the top section from coming down in case the rope should break and also that the strain can be taken off the rope when the tower is in the full-up position. Likewise, the two bottom sections are held together with the use of a small "D" clamp across two struts. This makes

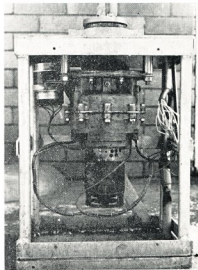
the tower completely safe in case of rope breakages and children playing with the winch. The clamps are fitted after the sections are raised to the required height. No climbing is needed to do this as the job can be done while standing on the roof. The few extra minutes this takes is worthwhile for the peace of mind it gives that the tower will not telescope itself on its own accord.

The tower is held against the house by means of a bracket and a ring assembly around the bottom section of the tower. The bracket is coach-screwed to the fascia. This serves to support the tower when it is being raised and lowered, and when it is in its nested down position, which is about 22 feet high. This is a very convenient height in my case as it is shoulder height when standing on the roof. When fully raised it is supported by three guy wires, two going back to the roof and the other back to a nearby tankstand.

The rotatable guy ring is shown in Fig. 1. It consists of two t.v. guy rings, a pipe spacer 5" long and a t.v. mast clamp. The spacer is used to prevent the guy wires from fouling the clamp during rotation. Thimbles are used in the guy rings to prevent them from severing the guy wires.

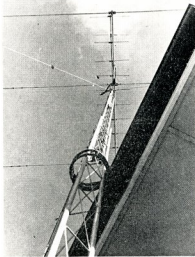
The co-ax. cables are formed in a large loop over the guy ring so that they will bend sufficiently and have enough to prevent them from becoming tight as the guys push against them during rotation. T.v. mast straps are used to clamp the cables to the mast at points 18" above and 18" below the guy ring to form the loop. With this

method the tower can be rotated through 420 degrees without any problem. Where the cables are clamped to the mast and where the guy wires are likely to rub against them, they are protected by wrapping rubber around them. The rubber used in this case was 1 1/2" wide and is normally used for fitting between the glass and the frame in the assembly of aluminium framed windows. The cables are clamped at intervals down the mast and are secured in such a way that no deformation in the shape of the co-ax. takes place. The whole tower can be lowered to roof height in about four minutes, including unclamping.



The tower sits on a large double race ball bearing assembly (out of a tractor) which is clamped on top of a steel frame. All the weight is taken on this bearing and the frame. The mountings can be seen in the photographs and Fig. 2. The gear box is mounted underneath the top plate by means of three large bolts. An appropriate size coupling, which fits firmly through the bearing, drives from the bottom of the gear box to the bottom of the tower. A 5" diameter by 1/2" thick plate is bolted to the top of this coupling by means of three 7/16" recessed studs. The tower, with its locating pin, is then held onto this plate by means of another three 7/16" studs.

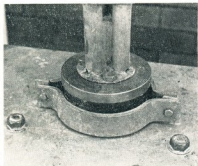
Any other suitable motor and gear box combination could be used to drive the tower as it takes very little to drive it. Wind loading on the antennas, which causes twist on the mast, should be



* 10 Druce Street, Toowoomba, Qld., 4350.

taken into consideration when choosing a suitable gear box. The drive gears may be stripped in the wind if these are not heavy enough.

The frame where the motor fits into is made from 1" round uprights cross-braced with 1 1/2" x 3/16" flat steel. The top plate is 3/8" thick. The whole assembly is welded and galvanised. Dimensions are 16" wide, 12" deep, 20" high. Weather proofing is achieved by means of an aluminium cover which is not shown. The tower is also earthed via the frame to a 6 ft. earthing stake a few inches away from it.



The bottom section, which is almost identical to the top section, apart from the top plate, is concreted into the ground. The top section fits over the bottom section and is located by means of pins which fit firmly in the pipes and are welded to the top section. If the QTH has to be shifted you only have to make a new bottom piece and concrete it into the ground. The motor and gear box can be removed without having to do anything to the tower and is only a five-minute job.

The transmitter selsyn is mounted in such a way that it is driven directly by means of a fishing line "belt" from the tower gear box/coupling. A slotted adjustment is provided on the selsyn mount to tension the "belt". The electrical circuit of the selsyns and drive motor is shown in Fig. 3. The motor is run on 28 volts a.c. and appears to work satisfactorily, taking 1 1/2 minutes for a revolution. Power is fed to the motors via a heavy duty multi-cored cable. At the moment the tower sup-

RESONANCE

(continued from page 8)

reactance of opposite sign in series with the aerial and this is what we did. So we connected a capacitive reactance of 75 ohms in series with the aerial.

Then the aerial impedance became:

$$\begin{aligned} \text{Aerial } Z &= \sqrt{R^2 + (XL - XC)^2} \\ &= \sqrt{52^2 + (75 - 75)^2} \\ &= 52 \text{ ohms } \pm J0. \end{aligned}$$

The aerial was now series resonant at the operating frequency, the power factor was unity and all the power fed to the aerial was used by the resistance of the aerial.

(In this discussion, dielectric losses in insulators and certain other losses have been ignored as they were of little consequence as the aerial was well designed.)

By making the aerial resonant so that the aerial became a pure resistance the design of the coupling network became simpler so that it was necessary only to match the a.c. resistance (impedance) of the co-axial cable to the resistance of the aerial.

The design of this network need not be considered at this stage.

Another practical application of a series resonant circuit concerned a fixed frequency transmitter. This transmitter produced an harmonic which was causing interference in the 7 megacycle (megahertz) Amateur band. The trans-

mitter was coupled to the aerial by means of a 600 ohms two-wire balanced transmission line.

To reduce this harmonic to negligible proportions an inductance and a capacitance were connected in series. This combination was then connected directly across the output of the transmitter. The capacitance was made adjustable and the series combination was tuned to series resonance at the harmonic frequency, with the transmitter in operation. The tuning was done by setting up a distance communications type receiver, tuned to the harmonic, telephone communication was maintained between the transmitter and receiver operators and the network was adjusted at the transmitter to give a minimum reading on the receiver signal strength meter indicating that series resonance had been obtained.

At the harmonic frequency the inductive and capacitive reactances were equal and as good quality components were used, this series resonant circuit was a virtual short circuit at this frequency, however at the fundamental frequency of the circuit was very high, so that the circuit had negligible effect.

In practice the arrangement proved completely satisfactory.

AMATEUR FREQUENCIES:

ONLY THE STRONG GO ON—SO SHOULD A LOT MORE AMATEURS!

ports a three element tri-band beam and a 10 element 2 metre yagi. The assembly has been in operation 15 months at the time of writing and has been very satisfactory without any trouble. There is no reason why a telescopic t.v. mast could not be rotated in the same manner or even a length of water pipe. The ideas to further adapt the unit are almost unlimited.

☆

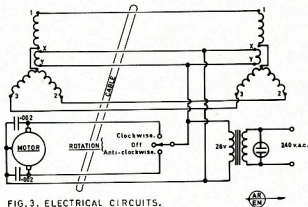


FIG. 3. ELECTRICAL CIRCUITS.

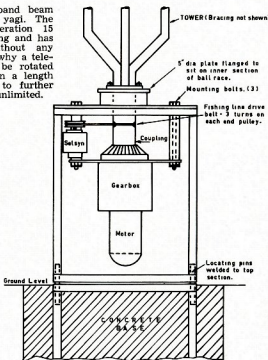


FIG. 2. TOWER MOUNTINGS.

Modifications to VK3 432 MHz. FET Converter for Operation on 576 MHz.

R. J. HALLIGAN,* VK3AOT/T

The VK3 V.H.F. Group 432 MHz. Converter,† which is available in kit form, has proved to be an excellent performer on this band. The possibility of using this converter on 576 MHz. is obvious in view of the small increase in frequency involved. The modifications presented are simple and the measured performance on 576 MHz. very satisfactory.

OSCILLATOR-MULTIPLIER CHAIN

The original circuit used a bipolar transistor oscillator-doubler. The same basic circuit has been retained, however some changes were made to suppress tendencies towards parasites with very active crystals. These effects were due to oscillation alternating between series and parallel modes.

The approach was empirical and the values, while being quite satisfactory in the author's converter, may not yet be optimum. The changes require no p.c.b. modifications. Only those values that have been altered are given on the circuit diagram—see Fig. 1a.

In the 432 MHz. converter, the oscillator-doubler stage was followed by two further doubler stages. For 576 MHz. operation, the final doubler is changed

to a tripler, giving an overall multiplication of 12. Changes associated with the tripler circuit are shown in Figs. 1b and 1c. No other changes to coil details are required in this section.

The appropriate crystal frequency can be calculated from one of the following formulae:

Single conversion:

$$X = (576 - I.F.) \div 12$$

Double conversion:

$$X = (576 - I.F.) \div 13$$

where X = crystal frequency in MHz.

I.F. = final (tunable) intermediate frequency in MHz.

When ordering crystals the circuit should be supplied to the manufacturer.

MIXER MULTIPLICATIONS

The only modification necessary involves shortening L4. Details are shown in Fig. 2.

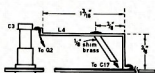


FIG. 2.

Modifications to mixer input circuit.

R.F. AMPLIFIER MODIFICATIONS

The modified amplifier circuit is shown in Fig. 3a. Output circuit changes are shown in Fig. 3b. Due to the reduced length of L3, it is necessary to re-locate the drain button bypass capacitor, C6.

Input and neutralising circuits require most changes. The input co-axial socket must be moved towards C1. Use is made of the area containing the input designation "IN". Heat the letters with a

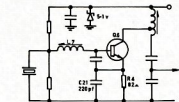


FIG. 1a.

L7-10 turns 30 B. & S. enamel wire, close wound.

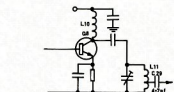


FIG. 1b.

L10-3 turns 26 B. & S., 3/16 inch i.d., spaced over 1/2 inch.
 L11-1 turn 18 S.W.G. See Fig. 1c.

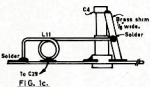
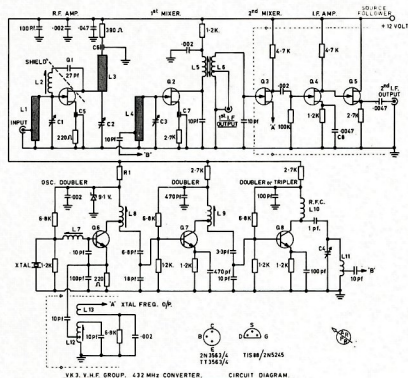


FIG. 1c.

L11-1 turn 3/16 inch i.d. 18 S.W.G. T.C.W.

Fig. 1—(a) Modified oscillator circuit.
 (b) Modified circuit of final multiplier.
 (c) Physical layout of final multiplier.



* 41 Windsor Street, Mt. Waverley, Vic., 3148.
 † "A.R." January 1970.

soldering iron until the copper lifts. The letters may then be removed and a 1/16" hole drilled in the centre of this area. Drill 1/16" diam. holes either side of the centre hole and mount the co-axial socket. Further changes are shown in Fig. 3c. Note the re-location of the neutralising coil, L2.

PERFORMANCE

The converter was built up as a double conversion unit. Gain is similar to that observed for the original 432 MHz. circuit. Sensitivity was measured as being 0.1 μ V. at the input terminals for 6 dB. signal-to-noise ratio (a.m., 10 KHz. i.f. bandwidth, 100% modulation). A Hewlett-Packard u.h.f. signal generator type HP612A was used for this measurement. The test results correspond roughly to the minimum readable signal under normal operating conditions. No facilities were available for noise figure measurements.

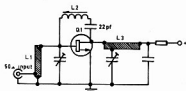


FIG. 3a.
L1—See Fig. 3c.
L2—3 turns 22 S.W.G. enamel wire. See Fig. 3b.
L3—See Fig. 3b.

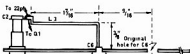


FIG. 3b.

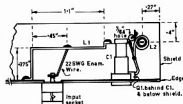


FIG. 3c.

Fig. 3.—(a) Modified r.f. amplifier circuit.
(b) Physical layout of amplifier output.
(c) Physical layout of amplifier input.

CONCLUSIONS

The use of the VK3 V.h.f. Group 432 MHz. converter kit provides a ready means of receiving on 576 MHz. Varactor transmitters producing up to 20 watts of f.m./c.w. or 6 watts of a.m. can be constructed in a few hours. Perhaps with the availability of these designs more Amateurs will explore the exciting world of u.h.f.

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R." in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.

A.M.S.A.T. Hosts Distinguished Guests

A special meeting of the Radio Amateur Satellite Corporation (A.M.S.A.T.) held in Washington on 3rd July heard talks by Michael Owen, VK3KI, President of the Wireless Institute of Australia; R. A. Vanmuyssen, ON4VY, Past President of the Belgium Amateur Society; Robert W. Deniston, W0DX, President of A.R.R.L.; A.R.R.L. Atlantic Division Director, Harry A. McConaghy, W3PEC.

The meeting also featured the presentation by Mr. Deniston of the League's 1969 Technical Merit Award to William L. Smith, W3GKP. The A.R.R.L. Board of Directors, at its 1970 meeting, conferred this award jointly on Mr. Smith and Paul M. Wilson, W4HHK, for their contributions to the art of moonbounce communication arising out of their e.m.e. experiments on the 2300 MHz. band.

Michael Owen, VK3KI, conveyed the thanks of W.I.A., Project Australis and Australian Amateurs generally to A.M.S.A.T., N.A.S.A. and the League for their various parts in the recent successful Australis Oscar 5 mission. He also expressed the anticipation for the next Amateur satellite which is felt in his country.

Jan King, W3GEY, Project Manager for A.M.S.A.T. Oscar-B (A-O-B), described progress on that satellite which will receive a regular Oscar designation once in orbit, hopefully about one and a half years from now. A-O-B, as presently planned, will contain two repeaters, both operating cross-band between the 144 MHz. and the 420 MHz.

band. One will be a broadband linear device similar to previous Oscar's, while the other will be a channelised f.m. repeater. Sophisticated command and telemetry provision will be included.

Jesse Wagner, K3GKB/WA2UYF, presented a discussion of some of the ionospheric propagation results noted at the N.A.S.T.A.R. station K2SS during the lifetime of Australis Oscar 5.

In addition to the guests already mentioned, the meeting was attended by A.M.S.A.T. members and others interested in the Amateur space programme from as far away as Richmond, Virginia and the New York City area.

VK3 WESTERN ZONE, W.I.A.

ANNUAL CONVENTION

to be held at

NHILL

ON

SATURDAY AND SUNDAY,
24th and 25th OCTOBER, 1970

Saturday, 1400 onwards: Registration and rag-chew, official dinner, guest speaker, entertainment.

Sunday, 1030: Tour of Little Desert National Park, barbecue lunch, meeting.

Hotels, Motels, Caravan Park, Aerodrome, Bookings with \$2 deposit to: Jim Bywaters, VK3AEF, 30 Queen St., Nhill, Vic., 3418.

Nail Glanville, VK3AOD, President, Bob Mitchell, VK3ARM, Secretary.



VK3KI talks back home to VK3ARD on 20 metres via the C.O.M.S.A.T. Club Station WA3JGG. Bob Deniston, W0DX, on the phone, while Harry McConaghy, W3PEC, A.R.R.L. Atlantic Division Director, looks on.

Keying Monitor and Band Edge Marker

R. TORRINGTON,* VK3TJ

SOME DAY

Breathes there a man, with soul so dead,
Who never to himself has said,
I must never, never, throw this away,
I'll find a use for it some day.

The rusty wire, the odd size nails,
The empty drums, the old fence rails,
He stores them all with air so gay,
Possitively sure they'll be used some day.

This shelf is piled with assorted screws,
And bits of leather for mending shoes.
The shovels have rotted, furry and grey,
But never mind, they'll come in one day.)

If you add to this he's a Radio Ham,
Your plain old hoarder's an also ran.
The condensers, the valves, the old relays,
They'll all be used, one of these days.

The chassis, the wires, the technical data,
Transistors, connectors, all such dusty errata,
Can fill up the house, but still he will say,
I'll get it to work, one of these days.

If, as well, he reads, and hates to part,
With printed paper, you've made a good start,
Toward screaming fits and hair so grey,
Whenever he says: "It'll be handy some day".

With cameras, telescopes, books, rocks and maps,
The stuff's piling up, it'll soon be out of gaps;
As the floor disappears, I'll soon be at bay,
Menaced by the things that will come in one day.

The future is grim, his son is the same,
With cars, trains, wire, nails, stamps, bits of
With anguished clutching, he will also say,
You can't throw that out, I'll need it some day.

When mothers give counsel to daughters so young,
The praises of handymen loudly are sung,
For reasons obscure, they never do say,
"Because of the man who will 'use that some day'".

They say, get your man a hobby or two,
But what if the man with some hobbies gets you?
You will wish he had not when again he does say,
I'll knock up some shelves for it all—some day.

No doubt there are others with menfolk like mine,
Resignation has grown, but at odd times I pine,
For a man who could sometimes, cheerfully,
say,
All this odd junk? Throw it away!

—S. Gillespie.

NEW N.Z.A.R.T. AWARD—5x5

This Premier Award has been instituted to recognize the increasing interest in five-band operation. The initial certificate can be obtained after contacting the SAME station on five different bands, repeated with other stations in four different D.X.C.C. countries. Endorsements are available for ten D.X.C.C. countries and then each further ten to one hundred when the ten available endorsements will have been won.

The award, which consists of a most attractive coloured picture (specially selected as appropriate for this award), requires a certified list of stations worked (with essential QSO data) and a fee of \$1 which includes the issue of all endorsements after qualification.

Applications to N.Z.A.R.T. Awards Manager, ZL2GX, 152 Lytton Road, Gisborne, New Zealand.

N.B.—Initial award requires five-band operation with five different D.X.C.C. countries. First endorsement after a further five has been contacted (making a total of 10), the 20 endorsement requiring a further 10 and so on.

AWARDS

Malanje Centenary Award is issued for working CREMG plus one other Malanje station on c.w. during the period Aug. 3 to Dec. 31, 1970, on any band between 7 and 28 MHz. Other Malanje stations are CR6BY, CD, EP, GQ, GW, HQ, JY, KB, KZ, LC, LK, IN, MG and NS. Logs plus QSLs to L.A.R.A., Concurso Centenario de Malanje, Caixa Postal 88, Matriz, Angola, P.W.A. This one is also available to S.W.I's.

LX Award for working stations since Jan. 1, 1951. GCR list including full log would need 10 IRCs to LX1AJ. VK ops. would need 20 points, one point being awarded per LX station per band on 20, 15 and 10, with two points on 40 and 80. A five-band QSO would count as 15 points. Not an easy one, but you have a lot of back log sheets to travel over.

One advantage with this circuit arrangement is that if the transceiver is switched off, the loss of —50v. from line activates the oscillator to remind one to switch the monitor off.

The unit is built into a box just large enough to take a 4-inch speaker. In addition, a band edge marker was built into the same box. Sufficient radiation takes place to produce good signals with the box several feet from the transceiver. A 7000 KHz. crystal was used to provide a band edge marker for 7 and 14 MHz.

The one megohm input resistance to Q4 should be quite satisfactory for all transceivers where the voltage on the key is negative with respect to the chassis and less than 100 volts.

MOBILE RADIO TECHNICIAN (Senior)

For the maintenance of V.H.F., F.M. and A.M. Radio-Telephone equipment. Ham Radio background useful but applicants MUST have had experience in the development or maintenance of mobile radio. Salary negotiable according to that experience.

For interview, after hours if necessary, ring Mr. Findlay on 807-1355.

FINDLAY COMMUNICATIONS

PTY. LTD.

2 POPE STREET, RYDE, N.S.W., 2112

One thing that was missed when changing from a transmitter-receiver combination to a transceiver was the key thumps whereby one could monitor quiet bug sending.

A monitor using r.f. pick-up to activate the audio oscillator was first tried, but it was too critical in location even when an additional amplifier was added.

For those transceivers that do not provide a keying monitor, this unit may be useful. The transceiver concerned employs a keying circuit where —50 volts appears across the key contacts with the key open and so this device makes use of this feature.

Q1 and Q2 form the oscillator for the audio tone while Q3 is an audio amplifier. Q4 and Q5 form the switch to activate the audio oscillator in sympathy with the keying. The values of the resistors and capacitors in the oscillator need not be exactly as shown, but happened to be on hand and produce a suitable audio tone. Practically any speaker transformer can be used. Only low audio output is required for monitoring purposes and losses with incorrect impedance transformers can be accommodated.

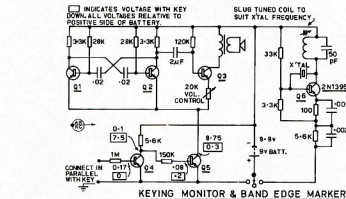
Q5 must have very low collector-emitter leakage otherwise the oscillator will be activated with low audio output in the key-up condition.

With key up, —50 volts is applied through a 1 megohm resistor to the base of Q4 which switches this transistor on. This condition turns Q5 off and so prevents the audio oscillator from operating.

As a guide, the voltages to be expected at the various parts of the circuit are shown. The unboxed figures are for key-up, while the boxed figures are for key-down conditions.

The current demand at 9v. is 1.5 mA. for key-up and 6 mA. for key-down.

* Thistle St., Pascoe Vale South, Vic., 3044



A Heterodyne Transmitter for Six Metres

PETER COLLINS.* AX3ZYO

There may be some who will wonder why an Amateur living in a primary t.v. area with Channel 0 is interested in building a 6 metre rig, but those who have been able to work a few 6 metre openings will agree that 6 is definitely the fun v.h.f. band.

Although t.v.i cannot be eliminated, a rig can be designed that will allow operation at most times. Even though a high power rig may give "loudest signal on the band" reports, this may not go down very well with the neighbours—low power operation on the other hand will cut t.v.i. troubles to a minimum and allow a few contacts to be made during band openings at times when Channel 0 is in operation.

This rig has been designed so that the exciter as described can be modulated and used as a low power rig or as an exciter for a high power final which can be used during non-television hours.

For best stability heterodyning was chosen in preference to a conventional v.f.o., which uses a low frequency oscillator to obtain stability, and is then multiplied to the required frequency and at the same time multiplying the drift. Heterodyning is the sum or difference of the two signals and the stability of the output is essentially that of the combined oscillator.

CIRCUIT DESCRIPTION

The 12AT7 crystal oscillator uses a series resonant 18.777 MHz. crystal and is capacitively coupled into the mixer cathode.

The variable oscillator is a receiver type circuit with the second half of the 12AT7 used as a cathode follower to

provide isolation and is capacitively coupled into the mixer grid; the output of the oscillator is 2.331-4.331 MHz.

The mixer input coupling condensers are chosen in value to provide the correct level of injection for best output, and minimum output of spurious signals.

The mixer tube is a 6AK5 and the output is the difference of the two oscillators (56.331 - 4.331 MHz.). It was decided to place the crystal/multiplier frequency above the desired frequency to avoid the possibility of interference from this signal; if the crystal oscillator was below the desired frequency it would be around 48-49 MHz. (depending on the v.f.o. frequency range chosen) and interference from this signal may result.

Link coupling from the mixer to the E180F r.f. amplifier was originally tried in an attempt to bandpass this circuit, but instability of the r.f. amplifier resulted and was subsequently changed to capacitive coupling, which eliminated this effect and still provided satisfactory operation. Both the E180F and 12BY7 r.f. amplifiers are quite conventional and employ capacitive coupling.

Two stages of amplification were tried in the original design, but it was necessary to run the stages beyond the correct ratings and the inclusion of another stage was necessary. A QQE03/12 was chosen, allowing the preceding stages to be throttled back yet maintain drive over a greater range.

The 3/12 was chosen as it is internally neutralised and can provide the

necessary output required for low power operation; the output butterfly capacitor is of 522 origin.

A power supply is incorporated in the unit and supplies 150v. regulated for the oscillators, 275v. for the mixer and E180F r.f. amplifier, and the heater supply.

Netting is achieved by energising the relay (RLY) which connects h.t. to the crystal oscillator/multiplier, mixer and r.f. amplifier; the variable oscillator is operative at all times. In the transmit mode, 300v. is supplied to the 12BY7 and 300v. modulated to the 3/12, the relay is also energised. These voltages are supplied from external supplies.

All wiring in the unit is run in screened cable and bypassed at both ends, external connections to the unit are decoupled with feed-through condensers and r.f. chokes in a pi network to prevent radiation from connecting cables.

ALIGNMENT

The first requirement is to ensure that the crystal oscillator/multiplier is adjusted to the correct harmonic, as checked with a wavemeter, then the variable oscillator should be checked to ensure that it covers the required range—the lowest frequency is set by the trimmer across L1 and the tuning range set by the condenser in series with the variable tuning condenser. The next step is to couple a wavemeter to the mixer anode coil and adjust for an output at 52 MHz. Output may also be obtained at the sum of the two oscilla-

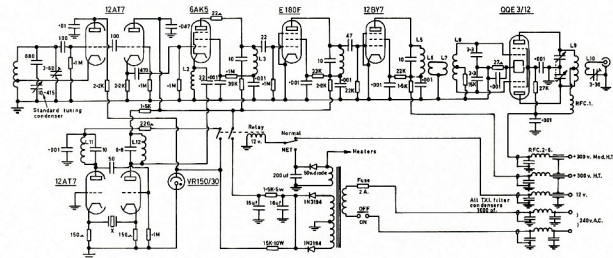


FIG. 1. HETRODYNE TRANSMITTER CIRCUIT

tors (60.66 MHz.) and the correct frequency should be carefully chosen.

At this stage the output can be heard on a receiver and a search should be made to check on any spurious signals indicating over driving of the mixer, which can be corrected by reducing the value of coupling condenser from the oscillator; some experimenting of the values of the input condensers may be needed to ensure maximum output with a minimum of unwanted responses. The E180F is a high gain tube and the unwanted frequencies are not far down on the wanted one at this stage and it is necessary to ensure that this stage

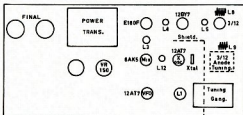


FIG. 2. CHASSIS LAYOUT.

is also tuned to the correct frequency; it is not wise just to tune up for maximum drive to the subsequent stage without checking on the frequency that is being amplified. The 12BY7 driver is tuned for maximum output at about 52.3 MHz.

No attempt was made to stagger tune the stages as the 3/12 can be driven to 2-3 mA. grid current across the range 52 to 53.4 MHz. The grid circuit of the 3/12 resonates at 52.0 MHz. with the 3.3 pF. condensers shown in the circuit, but it would be wise to check this with a g.d.o. and make any adjustments necessary.

All that is required now is to connect the h.t. and a load to the final and adjust the stages for resonance.

The unit is housed in a U-shaped compartment 15" wide, 9" deep and 6" high, which is bolted to a 7" rack-panel, shielding is completed with top and bottom covers suitably drilled to provide ventilation, but maintain shielding, a divider is placed vertically down the centre of the compartment and two sub-chassis are used, one for the exciter and the other for the final and power supply.

The final amplifier used with this unit is a push-pull pair of 6146s and when required is connected to the exciter via a co-ax. jumper lead.

COIL DATA

- L1—36 turns 26 B. & S. enamelled on 3" former, spaced 1 turn.
- L2—32 turns 26 B. & S. enamelled, 1/4" former.
- L3—5 turns 26 B. & S. enamelled, 3/8" former, slug tuned.
- L4—6 turns 26 B. & S. enamelled, 3/8" former, slug tuned, spaced 1 turn.
- L5—6 turns 26 B. & S. enamelled, 3/8" former, slug tuned, spaced 1 turn.
- L6—2 turns link on cold end of L5, single strand hook-up wire.
- L7—Same as L6 around centre of L8.

- L8—Air wound inductance (Wm. Willis No. 2-16) 12 turns centre tapped (20 g. 5/8" diam., 16 t.p.i.).
- L9—Same as L8, 8 turns centre tapped.
- L10—2 turn link, single strand p.v.c. hook-up wire around centre of L9.
- L11—20 turns 28 B. & S. enamelled, 3/8" slug tuned former.
- L12—5 turns 26 B. & S. enamelled, 3/8" slug tuned former, spaced 1 turn.
- RFC1—17/16" winding length, 28 B. & S. enamelled on 1/4" former.
- RFC2—6—15 turns 26 B. & S. enamelled, close wound on high value 1w. resistor.

CONTEST CALENDAR

- 3rd/4th October: VK-ZL-Oceania DX Contest (phone).
- 10th/11th October: VK-ZL-Oceania DX Contest (c.w.).
- 10th/11th October: R.S.G.B. 28 MHz. Phone Contest.
- 16th/18th October: R.T.T.Y. Plaque Sweepstakes.
- 17th/18th W.A.D.M. C.W. Contest.
- 24th/25th October: "CQ" W.W. DX Phone Contest.
- 24th/25th October: R.S.G.B. 7 MHz. DX Contest (c.w.).
- 7th/8th November: R.S.G.B. 7 MHz. DX Contest (phone).
- 28th/29th November: "CQ" W.W. DX C.W. Contest.
- 5th Dec. to 11th Jan.: Ross Hull Memorial Contest.
- 13th/14th Feb.: John Moyle Memorial National Field Day.

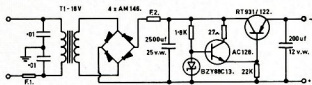
A LOW-COST COUNTER

(continued from page 7)

interest in counting, an effective a.c. line filter is suggested. An 086 can be used in place of the AC128.

The unit thus far described has been mounted on a breadboard and panel. It is illustrated in the photographs, which show the general layout. This unit was built separately as a counter with a reset facility and will reliably count 4 volt negative pulses at a repetition frequency of some hundreds of thousands per second.

Counting is fun—the run of the count through the lamps is very soothing to



12V. REGULATED POWER SUPPLY.

"CQ" W.W. DX CONTEST

PRECIS OF RULES

Bands: 1.8 to 28 MHz.
Exchange: RS/RST plus Zone.
Dates: Phone, Oct. 24/25; C.w., Nov. 28/29.
Time: 0900 GMT Saturday to 2400 GMT Sunday, for both week-ends.
Scoring: (a) 3 points between stations on different continents; (b) 1 point between stations on the same continent but in different countries; (c) Contacts between stations in the same country are permitted for Zone and/or Country multiplier but have no QSO point value.
Final score: (a) single band, Zones plus countries multiplied by QSO points; (b) all band sum of Zones plus sum of Countries multiplied by total QSO points.
Competition: Three divisions:—(a) single operator, single band or all band; (b) multi operator, single transmitter; (c) multi operator, multi transmitters.
Logs: To "CQ" W.W. DX Contest, 14 Vanderventer Ave., Port Washington, Long Island, N.Y., U.S.A., 11050.
Detailed Rules in October 1970 "CQ".

AUSTRALIAN RESULTS 1969 W.W. CONTEST C.W.—

Band	Score	QSO	Zon.	Contrs.
VK2BKM	All	871,854	1180	97 146
VK2GW	All	280,720	548	74 102
VK2APK	All	292,820	820	34 87
VK3RJ	28	1,230	108	18 24
VK3AXX	21	110,960	481	30 50
VK3XB	21	1,408	44	12 20
VK3QI	14	44,608	243	24 40
VK3CP	7	23,048	179	17 26
VK3APN	3.5	8,904	130	11 17
VK4PH	All	113,480	395	42 55
VK3P	28	18,207	121	24 27
VK3FM	All	141,008	422	40 72
VK3NO	7	87,542	411	26 48
VK4BD	All	218,400	560	70 124
VK4RU	28	116,172	477	26 58
VK8AJ	All	85,904	324	29 62
VK7CH	All	43,014	142	49 58

Phone—

Band	Score	QSO	Zon.	Contrs.
VK3WD	All	38,790	153	29 61
VK2APK	All	44,262	1030	36 115
VK2BKN	All	12,544	72	23 41
VK3XB	All	12,586	83	30 28
VK3SS	21	12,965	84	21 28
VK4PH	All	329,760	691	65 115
VK4DO	All	28,575	143	27 48
VK4NS	All	4,512	48	16 10
VK4RU	All	1,774,808	1895	105 224
VK8X1	All	49,953	283	51 58
VK9KS	All	110,691	311	54 93
VK2BKM/2	All	896,736	1336	80 161
VK9RY	All	43,660	286	22 37

watch. On the other hand, it's like having a microamp. meter: you can measure current in microamps, but you can do a lot more with the meter if you make up the auxiliary apparatus. A future article will describe a control unit which permits frequency measurement up to 1 MHz./sec., again using parts from computer boards.

My thanks are due to Dr. B. McMillan for the photographs and Mr. D. Cato for the panel decoration.

REFERENCES

- Black, R. H., 1970, Count and Display at \$6 per decade, "Amateur Radio," 38, No. 6, 7.
- Cleary, J. F. (Ed.), 1964, Transistor Manual, 7th Ed., Syracuse, N.Y., General Electric Co.

THE GROWTH OF RADIO COMM. IN AUSTRALIA

The following figures recently released by the P.M.G. Department are of interest. These figures are the annual returns showing the total of all stations authorised in Australia and Territories as at 30th June, 1970:

Category	Year ending June 30
Land	10,845
Fixed	5,601
Mobile	113,184
Amateur	6,238
Total	135,868

It is also interesting to note the following:—

53,551 base, mobile and fixed stations operate between 70 and 85 MHz.

29,238 base, mobile and fixed stations operate between 148 and 174 MHz.

865 base, mobile and fixed stations operate between 450 and 520 MHz.

You are cordially invited to speculate as to the further development of Radio Communications in Australia!

—W.I.A. Federal Secretary.

13th JAMBOREE-ON-THE-AIR

The 13th Jamboree-on-the-Air will be held over the week-end of 17th and 18th October, 1970. Starting time will be 0001 G.M.T. on Saturday, the 17th, and the event will terminate at 2359 G.M.T. on Sunday, the 18th. Stations may, of course, operate for any period of time within these limits.

It is suggested that the official World Scout Frequencies listed below be used as calling frequencies only (i.e. for initial contacts only). After contact has been made, the stations concerned should move away (QSY) to continue their conversations.

80-75 Metre band:
3,590 c.w., 3,740 phone, 3,940 U.S.A. phone.

40 Metre band:
7,030 c.w., 7,090 phone, 7,290 U.S.A. phone.

20 Metre band:
14,090 c.w., 14,290 phone.

15 Metre band:
21,140 c.w., 21,360 phone.

10 Metre band:
28,190 c.w., 28,990 phone.

COOK BI-CENTENARY AWARD V.H.F./U.H.F. SECTION

The following stations have qualified for the Award:

Cert. No.	Call
1	AX3ZNJ
2	AX3ZBT

Here's the solution to all-band working in a limited space—

G8KW TRAP-TUNED ALL-BAND KIT

Kit comprises two fully weather-proofed pre-tuned high Q trap coils resonant at 7.1 MHz., and large ceramic "T" centre insulator.

Price \$18.40 (tax paid)

FEATURES—

- 75 ohm co-axial feed or twin flat transmission line.
- Only 108 feet long.
- Operates on six bands.
- Reasonable SWR on all bands.
- Simple to erect.
- No "cut and try" necessary.
- Full instructions with each kit.

WILLIAM WILLIS

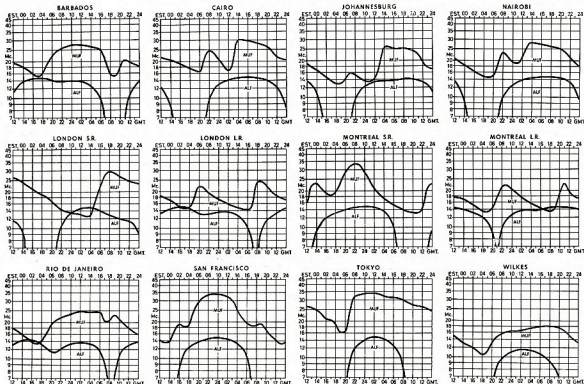
& CO. PTY. LTD.

Electronic and Radio Equipment Supplies

77 Canterbury Road,
Canterbury, Vic., 3126
Phone 836-0707

PREDICTION CHARTS FOR OCTOBER 1970

(Prediction Charts by courtesy of Ionospheric Prediction Service)



NEW CALL SIGNS

MAY 1970

VK1J1T—J. E. Townsend, 43 Lambrigg St., Far-
er, 2907.
VK1MF—M. G. Foster, 65 A Beckett St., Watson,
2602.
VK2IE—R. C. Richards, 28 Main Rd., Thirroul,
2515.
VK2N—R. Choy, 40 Castlereagh St., Concord,
2137.
VK2XI—R. J. Fleming, 52 Belmore St., Bega,
2550.
VK2AAN—M. J. Hardy, 6 Juliet St., Charles-
town, 2290.
VK2AIX—P. L. Jamison, Jr., Unit 4A, Thorn-
-ton St., Darling Point, 2027.
VK2ATM—A. T. Monck, 27 Park St., Pt. Mac-
-quarie, 2444.
VK2ZDE—R. A. Day, 37 Ranclaud St., Booragul,
2284.
VK2ZGB—B. C. Tucker, 4/9 Robwald Ave.,
Mangerton, 2500.
VK2ZII—W. L. Wietich, 1/8 Hazelbank Rd., Woll-
-stonecraft, 2055.
VK2ZSB—S. T. Mudge, 32 Willarong Rd., Mt.
-Solah, 2078.
VK2ZVC—G. D. Vaughan, 4 Lucas Ave., Moore-
-bank, 2170.
VK2EE—F. V. Hughes, 6 James St., Morwell,
3640.
VK3JR—K. B. Bennie, 96 Stawell St., Sale,
3650.
VK3UV—L. E. Martin, 28 Leura St., Murrum-
-beena, 2163.
VK3AE—J. C. Caldwell, 57 Station St., Bel-
-grave, 3150.
VK3AY—G. R. Boyle, 37 Shakespeare Ave.,
Fremont, 3125.
VK3AD—G. C. Baker, 22 McMillan St., Clay-
-ton, 3168.
VK3BCI—C. A. Beulke, 228 Eleventh St., Mil-
-dura, 3040.
VK3BCU—N. P. Muscat, 46 Jackson St., Nid-
-drie, 3042.
VK3BCV—N. Cassidy, 8 Brooke Dr., Altona,
3018.
VK3BDD—D. Vlassopoulos, 2 Sandgate Ave.,
Waverley, 3150.
VK3BDM—R. W. Kilgour, 7 Chingford St.,
Fairfield, 3078.
VK3BDN—R. G. Harding, 5 Marroo St., Don-
-caster, 3160.
VK3BDY—G. Butterworth, Mickleham Rd., Tul-
-lamarine, 3043.
VK3YDD—W. Yunker, 4/56 Lillimar Rd., Or-
-mond, 3204.
VK3YDE—L. A. Gardiner, 10 Lingwell Rd.,
Auburn, 3122.
VK3YDF—J. E. Walker, 17 Burgess St., Haw-
-thorn, 3123.
VK3YDJ—J. A. Gleeson, 29 Manuka St., South
-Oakleigh, 3167.
VK3YDK—S. King, 1 Kalmia Ave., Mt. Waver-
-ley, 3149.
VK3YDL—L. H. Hazeldine, 3 Grandview Gr.,
Doncaster, 3162.
VK3YDN—J. F. Bear, 38 Wilfred Rd., East Ivan-
-hoe, 3079.
VK3YDO—A. R. Atkins, 29 Flinders St., East
-Kew, 3042.
VK3YDR—N. R. Darragh, 15 Royston St., East
-Rosanna, 3084.
VK3ZHF—R. A. Wright, 19 Culshaw Ave., Clay-
-ton, 3168.
VK3ZII—W. H. Lane, 4 Edith Ave., Nunawad-
-ing, 3133.
VK3ZQF—A. A. Keenan, 15 Grout St., Hampton,
3188.
VK3ZYP—P. T. Collins, 14 Coleman Rd., Waver-
-ley South, 3152.
VK3ZZA—J. A. Frost, 28 Stanley Gr., Can-
-terbury, 3126.
VK4HY—H. H. Varnes, 3 Leeson St., Bunda-
-berg, 4070.
VK4OE—A. A. Hirstone, 92 Albert St., Ingie-
-wood, 4387.
VK4YC—Yeronga Technical College, Station:
College Park Rd., Yeronga, 4104; Postal:
P.O. Box 45, Yeronga, 4104.
VK4ZCM—S. B. McGregor, 114 Main Rd., Clon-
-tarf Beach, 4019.
VK4ZCS—C. P. Stubbs, 19 Bradford St., Edge-
-cliff, 3160.
VK4ZCY—R. J. Hicks, 70 Primrose St., Sher-
-wood, 4075.
VK4ZEE—E. Binnie, 21 General St., Hendra,
4011.
VK4ZLK—L. C. Kelo, 46 Gavegan St., North
-Bundaberg, 4070.
VK4ZLW—W. A. Hamilton, Police Station, Neil
-St., Toowoomba, 4350.
VK4ZYX—N. M. Turner, 12 Market St., In-
-dooroopilly, 4066.
VK5IG—R. J. Hester, Station: 46 Lambeth St.,
Cecola, 3500; Postal: C/o. O.T.C. Control
Station, Cecola, 3590.

VK5AWI—Wireless Institute of Australia (S.A.
Division) V.H.F. Group, C/o. J. A. Hack-
-worth, 34 Oaklands Rd., Somerton Park,
5044.
VK5ZBI—M. R. Haskard, 64 Malvern Ave.,
Malvern, 5061.
VK6FI—A. N. MacTaggart, Station: Meekath-
-arra; Postal: P.O. Box 74, Meekatharra,
6542.
VK6NA—B. Nosedo (Rev. Fr.), Kalumburu Mis-
-sion, via Wyndham, 6740.
VK6RZ—A. L. Mansfield, Station: U.S. Nav-
-commis, Exmouth; Postal: P.O. Box
24, Exmouth, 4791.
VK6TA—K. A. Thomas, 12 Beresford Ave.,
Geraldton, 6530.
VK6JM—J. P. Meehan, Box 1, Connellan Mess,
Alice Springs, 5750.
VK8ZC—G. G. Baker, Flat 2, Mowhay Flats,
Cr. Bennett and McMin Sts., Darwin,
5790.

CANCELLATIONS

VK1BE—E. F. Bacon, Transferred to Qld.
VK1NC—J. D. Blackie, Not renewed.
VK1ZOL—M. G. Foster. Now VK1MF.
VK2ACW—C. O'Connor. Not renewed.
VK2ADR—J. D. Hunt. Not renewed.
VK2AG—R. J. Fleming. Now VK2XI.
VK2ZC—J. F. Scougall. Transferred to S.A.
VK2BLH—J. Bays. Transferred to Vic.
VK2BTM—A. T. Monck. Now VK2ATM.
VK2BZ—Rockdale Youth Radio Club. Not
renewed.
VK2ZAI—R. A. Isaac. Transferred to Qld.
VK2ZII—J. F. Davis. Transferred to Vic.
VK2ZQD—W. L. Wietich. Not renewed.
VK3ANZ—W. E. Sadler. Not renewed.
VK3ASE—L. E. Martin. Now VK3UV.
VK3BAU—L. C. Beulke. Now VK3BCI.
VK3BCU—C. Nelson. Not renewed.
VK3YCA—F. V. Hughes. Now VK3EE.
VK4MX—T. J. R. Martin. Not renewed.
VK4ZVH—H. V. Hunt. Not renewed.
VK4ZVN—V. G. Novotny. Not renewed.
VK4ZZZ—R. G. Crawford. Not renewed.
VK5HG—H. M. Cooper. Not renewed.
VK5LJ—R. W. Langford. Deceased.
VK5PR—K. W. Kilgour. Not renewed.
VK5WY—J. F. Westley. Transferred to Vic.
VK5ZW—Wireless Institute of Australia (S.A.
Division) V.H.F. Group. Now VK5AWI.
VK6ZDG—B. Nosedo (Rev. Fr.). Now VK6NA.
VK6ZEG—R. W. Godley. Transferred to Vic.

CORRECTION

The P.M.G. Department, Radio Branch, have
noticed that a mistake appeared in their copy
of the January 1970 Call Signs, which was
published in June "A.R." The correct call sign
of A. J. Jeffrey is VK3YJC.

OBITUARY

July was a bad month for VK6 Division
because we lost two old timers from our
ranks.

CLARRIE COOKE, VK6CPC
Firstly, Clarrie Cooke, VK6CPC, a Life
Member of this Division. He first came
on the air in the early 1930s using a pair
of 46s. His equipment was truly home
brew from power transformers and
resistors to r.f. chokes. Like other pre-war
Amateurs, he was "rock bound" and a
keen c.w. exponent. Clarrie's only de-
parture from home brewing was the pur-
chase of an RA10FA receiver, which he
continued to use until going off the air.
It was a tribute to the efficiency of his
rig and two element beam that he was
well sought after by DX stations from all
parts of the world.

LOU STAGG, VK6LU

The second silent key was L. Stagg,
VK6LU. Lou's favourite band was 40
metres, with 15 metres running a close
second. A very keen c.w. operator, he
often used to remark that "it opens up
new worlds, it's like another universe."
Nevertheless, he was quite active on phone
as well and for the last twelve months or
so used a couple of bits of JA equipment
to good advantage. A friendly fellow who
could spin a spade, Lou was not afraid
to get on his feet at a meeting or else-
where to present his point of view.

The VK6 Division is surely the poorer
with the passing of these two gentlemen
from the Amateur ranks.

New Equipment

SPEECH COMPRESSOR



A speech compressor, designed for
amateur and professional use, which
can be used on any type of transmitter,
to boost the power of s.s.b. operation,
or lift a.m. transmitter modulation, is
now available. Designated Model MC-
22, the unit is fully transistorised and
functions from type 216 or 9v. battery.
A built-in audio oscillator provides a
signal to adjust s.s.b. transmitters. Price
including sales tax is \$28. Further in-
formation from Bail Electronic Services,
60 Shannon St., Box Hill North, Vic.,
3129.

SEMICONDUCTOR CATALOGUE

A catalogue of semiconductor de-
vices available in Australia has just
been released by Radio Parts in Mel-
bourne. It contains 20 pages of com-
pactly printed technical data including
functions and prices of semiconductors
from Fairchild, Texas, Anodeon, and
Minivatt. Copies may be obtained by
written request to Radio Parts, 562
Spencer Street, Melbourne, Vic., or
branches at 157 Elizabeth St., Mel-
bourne, or 1103 Dandenong Rd., East
Melvern, Vic.

VK3 ANNUAL V.H.F. CONVENTION

V.H.F. ENTHUSIASTS OF ALL STATES ARE
CORDIALLY INVITED TO ATTEND THIS
CONVENTION WHICH WILL BE HELD IN

MELBOURNE

OVER THE WEEK-END OF

10th & 11th OCTOBER, '70

Programme includes lectures by prominent
workers in v.h.f. and microwave equipment,
and competitions of interest to everybody.

Registration Fees: Amateurs and Listeners,
\$2.50; Saturday night dinner, \$2.00 per adult
and \$1.00 per child. Please register by
Monday, 21st September.

For details send s.a.s.e. to—

V.H.F. GROUP,
VICTORIAN DIV., W.I.A.,
P.O. BOX 30,
EAST MELBOURNE, VIC., 3002.

Inexpensive family accommodation can be
arranged.

Extracts from "The Calendar" of International Amateur Radio Union

SPACE CONFERENCE

With less than one year until the start of the I.T.U. World Administrative Radio Conference on Space Techniques, the I.A.R.U. has accelerated Amateur preparatory efforts as acute. The Conference, to be held in Geneva beginning 7th June, 1971, will examine the frequency allocations to the Amateur Service with regard to the use of space communications techniques. No significant change in frequency allocations is contemplated. However, at stake is the international authority for the Amateur Service to use its allocations for space communications purposes.

There currently exists a footnote to the Radio Regulations specifically authorising transmissions from artificial satellites in the world-wide two metre band. Some administrations take the position that such activity is permissible ONLY in this band. If Amateur satellite transmissions remain limited to 144-148 MHz, the development of Amateur space communications techniques will be unduly constrained. Thus it is an objective of organised Amateur Radio to seek greater freedom for the use of space techniques.

The need for permissive regulations for Amateur space work is felt, perhaps, the greatest in countries having a dominant position in Amateur space activity. In other countries, where there is little or no participation in space communications, the importance of space allocations may not be sufficiently realised. In fact, some member societies have expressed the view that since they currently have no Amateur space activity, it is necessary to engage in Space Conference preparations with their government.

Even though a country may have no Amateur space activity, preparation for the Space Conference should not be minimised for two main reasons: First, each member society by urging its government to support the Space Conference at the conference, will greatly aid the Amateur Service world-wide by gaining additional favourable conference votes. Second, by incurring a favourable government position for space activities, member societies will allow for the future development of space activities in their own country. Third, it is necessary for the future of Amateur Radio should not be overlooked.

Initial indications are that the Amateurs' request for permissive space communications regulations will not go uncontested. In fact, even countries whose attitude toward the Amateur Service is doing far from ideal, have expressed serious reservations to Amateur space operations. Unfortunately, many nations feel that Amateur satellites should be permitted to operate only in exclusive world-wide Amateur allocations (7, 14, 21, 28 and 144 MHz bands). The reason behind this view is to protect other services from interference in bands shared with Amateurs or allocated only on a regional basis.

In order to obviate such a frequency restriction, A.R.R.L. joining with the Radio Amateur Satellite Corporation (A.M.S.A.T.) has proposed that we be allowed to operate satellites in all Amateur assignments, consistent with the radio regulations of the respective administrations, provided that an adequate means, such as ground stations, is provided to prevent harmful interference to other services, and indeed, to terrestrial Amateur communications. It is felt that the operation of Australis-Oscar 3 clearly demonstrates that Amateurs are capable of controlling a satellite by ground command, and that through this technique, harmful interference to other communications can be effectively alleviated.

This, then, is the essence of the story which should be communicated to the licensing authorities of all I.A.R.U. member societies.

The following are preliminary views of various administrations which have been brought to the attention of I.A.R.U. Headquarters:

Algeria: Supports the cause of Radio Amateurs.
Canada: The Amateur Service might be permitted to use space techniques only in those portions of the bands allocated exclusively to the Amateur Service on a world-wide basis.

Denmark: The use of satellite technology by Amateurs should be restricted to frequency bands which, in all three I.T.U. regions, have been allocated exclusively to Radio Amateurs.

France: Allow Amateurs the use of space techniques only in the bands reserved for the purpose exclusively throughout the world.
Germany: Space communication techniques may be used in all exclusive Amateur allocations.

If the allocation is not uniform in all regions, satellites can only be permitted if they do not cause interference to other services in the remaining regions.

Greece: One hundred per cent. pro Ham Radio.

Kuwait: Same as U.S.

Netherlands: No objection to apply the present footnote No. 2.8A to all bands allocated to the Amateur Service on a world-wide and exclusive basis.

Nicaragua: Will support the points of view in favour of Amateurs.

Portugal: Inconvenient to permit Amateur use of space techniques. Should such use be authorised, it should be limited to bands allocated exclusively to Amateur use and with the exclusion of stationary satellites.

Saudi Arabia: Same as France.

South Africa: Same as U.S.

1970 SUMMARY OF ANNUAL REPORTS

Country	Dues & U.S.	Society Members	Licensed Members	Total Stations	Membership necessary for Licence	Annual Licence Fee	Age Limit	Citizenship Required	Maximum Power	Third-Party Traffic	Emergency Corps	Data Date
Algeria	5.00	250	16	16	yes	8.00	16	no	100	no	no	1970
Angola	5.00	530	230	230	yes	—	no	no	100	no	no	1970
Argentina	6.85	1,600	1,200	14,000	yes	1.00	yes	1,000	45	yes	yes	1969
Australia	8.80	4,430	2,800	6,080	no	2.20	14	yes	150	no	300	1970
Austria	2.00	1,434	1,174	—	no	15.00	18	no	250	yes	no	1969
Bahamas	1.40	80	11	—	yes	5.71	yes	150	no	no	no	1969
Barbados	0.40	10	—	—	—	—	—	yes	500	no	yes	1968
Belgium	7.00	1,230	780	1,200	no	12.00	16	no	500	no	120	1969
Bermuda	8.00	35	38	40	no	3.00	no	yes	150	yes	no	1970
Bolivia	1.04	107	107	—	—	—	—	yes	1,000	yes	yes	1967
Brazil	8.00	12,772	12,034	12,334	—	—	14	yes	1,000	yes	yes	1968
Bulgaria	0.50	2,905	446	446	yes	0.70	18	yes	1,000	no	—	1969
Burma	15.00	366	13	—	no	1.00	15	yes	1,000	no	no	1968
Canada	5.50	3,620	3,191	12,061	no	10.00	15	no	1,000	yes	316	1970
Ceylon	2.00	141	58	38	no	3.00	18	yes	150	no	no	1970
Chile	10.00	1,000	920	1,550	no	5.00	15	no	100	no	80	1969
Colombia	15.00	366	13	—	no	1.00	15	yes	1,000	no	no	1970
Congo	3.00	—	—	—	—	5.00	16	no	100	—	—	1961
Costa Rica	10.00	175	150	400	—	3.00	no	—	1,000	yes	—	1968
Cyprus	1.40	26	20	25	—	—	14	yes	150	no	—	1969
Czechoslovakia	4.00	4,720	1,970	2,350	—	13.50	18	yes	—	yes	—	1969
Denmark	5.00	3,000	4,553	—	no	4.00	16	no	300	no	—	1968
Dominican Rep.	15.00	100	100	500	no	no	no	no	yes	yes	—	1969
East Africa	3.00	113	60	—	no	0.00	no	no	150	yes	24	1969
Ecuador	1.86	600	400	350	—	—	18	no	1,000	yes	yes	1968
El Salvador	24.00	87	83	183	no	none	12	yes	1,000	yes	—	1969
Fiji	1.50	2,500	1,000	1,000	—	—	—	—	1,000	yes	—	1969
Finland	7.00	2,232	2,000	2,000	yes	—	—	—	200	no	80	1969
France	5.50	6,463	3,250	5,405	no	7.00	16	yes	100	no	—	1970
Germany	10.00	20,381	12,311	18,354	no	14.00	18	no	150	no	—	1970
Ghana	4.37	33	136	—	—	15.00	—	no	150	no	—	1968
Greece	8.00	230	80	85	yes	none	16	yes	150	no	no	1970
Guatemala	1.00	140	130	135	—	—	18	no	1,000	yes	—	1963
Honduras	12.00	40	30	30	yes	5.00	16	no	150	no	—	1969
Hong Kong	8.60	79	40	41	no	8.60	16	yes	150	no	—	1969
Hungary	—	621	621	621	yes	1.00	16	yes	500	no	—	1970
Iceland	5.00	30	31	31	yes	1.10	16	yes	500	no	—	1969
India	2.00	360	220	—	no	2.00	14	yes	150	no	—	1969
Ireland	3.60	222	153	206	no	5.00	16	yes	150	no	no	1970
Israel	4.50	850	540	600	no	1.00	no	yes	500	yes	yes	1969
Italy	6.40	8,000	2,500	3,550	no	16.00	16	no	200	no	—	1969
Ivory Coast	10.00	76	36	37	no	29.00	16	no	200	no	—	1969
Jamaica	5.15	65	45	30	no	2.40	no	yes	1,000	no	25	1970
Japan	41.700	34,222	100,827	—	yes	8.00	no	yes	500	no	yes	1970
Korea	4.00	350	230	90	yes	6.80	no	yes	500	no	yes	1970
Lebanon	7.00	60	60	110	no	17.00	18	no	100	no	6	1969
Liberia	7.00	58	58	68	yes	10.00	12	no	2,000	yes	18	1968
Luxembourg	4.00	138	95	95	no	5.00	16	yes	150	no	—	1969
Malaysia	2.40	79	60	—	no	4.90	no	yes	150	no	—	1970
Malta	4.00	97	23	—	no	4.90	14	no	150	no	—	1970
Mauritius	4.00	50	50	50	no	5.00	16	yes	150	no	—	1969
Mexico	9.60	1,002	1,002	2,010	no	2.27	—	yes	1,000	no	230	1970
Monaco	2.00	22	19	19	no	no	16	no	100	no	no	1970
Morocco	8.00	50	50	50	no	4.00	18	no	no	yes	—	1970
Mozambique	12.00	300	100	200	no	1.00	16	yes	150	no	—	1969
Netherlands	8.00	3,256	1,700	2,100	no	6.00	18	yes	150	no	—	1970
Netherlands Ant.	7.50	38	25	68	no	7.00	18	yes	1,000	no	no	1970
New Zealand	2.350	1,200	1,200	3,950	yes	2.50	14	yes	150	no	250	1970
Nicaragua	18.50	210	120	350	yes	none	no	no	2,000	yes	yes	1970
Nigeria	2.80	45	8	9	no	8.40	14	yes	150	no	no	1970
Norway	12.00	1,641	1,347	2,618	no	8.00	16	yes	150	no	—	1969
Panama	5.50	1,100	1,100	1,170	no	5.50	16	yes	1,000	yes	yes	1969
Paraguay	8.00	184	184	184	no	4.50	no	yes	1,000	yes	yes	1969
Peru	1.25	481	470	1,037	—	2.15	no	yes	1,000	yes	yes	1965
Philippines	4.00	97	47	131	no	5.00	14	yes	1,000	no	10	1970
Poland	5.00	6,000	2,864	3,234	yes	none	15	no	750	no	—	1970
Portugal	6.30	700	400	369	yes	7.00	16	no	400	no	no	1969
Rhodesia	2.78	207	157	198	no	5.50	16	yes	150	no	—	1969
South Africa	8.60	2,665	1,100	1,270	no	1.50	16	yes	150	no	—	1969
Spain	8.60	2,839	1,120	1,120	yes	—	—	—	50	no	—	1970
Surinam	8.50	46	46	46	no	2.68	18	yes	150	no	—	1969
Sweden	10.00	2,868	2,868	3,450	no	2.00	16	yes	500	no	—	1969
Switzerland	1.15	1,468	790	917	no	14.00	15	yes	150	no	—	1970
Syria	3.50	35	13	14	yes	6.50	18	yes	500	no	no	1969
Trinidad & Tob.	1.00	53	31	31	no	8.00	16	yes	1,000	yes	yes	1969
U.S.S.R.	2.70	114,600	5,008	15,063	no	none	16	yes	200	no	no	1969
United Kingdom	6.00	16,090	7,800	15,318	no	7.50	14	yes	150	no	yes	1970
U.S.A.	6.50	91,573	71,007	206,000	no	6.80	none	yes	1,800	yes	yes	1970
Uruguay	1.00	1,000	1,000	1,000	no	—	—	—	500	no	—	1969
Venezuela	53.28	1,950	1,850	3,009	—	22.50	21	yes	1,000	yes	yes	1968
Western Samoa	7.14	10	6	7	—	4.50	14	yes	150	no	no	1968
Yugoslavia	2.00	30,050	1,750	1,750	yes	—	—	—	500	no	—	1970
Zambia	2.38	43	40	54	no	2.38	18	no	150	no	—	1970

Sweden: Supports Amateur satellite operations in exclusive Amateur bands with the exception of the use of geostationary satellites.

United Kingdom: Amateur space communication may be allowed in exclusive Amateur allocations. However, the U.K. is agreeable to space communications in shared allocations at 420 and 1295 MHz, provided that there are safeguards and that the onus of avoiding interference lies with the stations of the Amateur Service. The safeguards discussed included the provision of telecommand facilities and the possibility of a limitation of the power density at the earth's surface.

United States: Space communication techniques may be used by the Amateur Service on all allocations within the limitations imposed by the table of frequency allocations.

What is there to be done? Each I.A.R.U. society should, if not already accomplished, inform its licensing authority of the needs of the Amateur Service for the forthcoming conference. This is a very important step since the views of administrations will be determined prior to the actual conference in Geneva. I.A.R.U. Headquarters will offer assistance, where appropriate, to member societies in preparing their presentations about the space conference to telecommunication officials. Please keep us advised of your efforts, and let us know whenever we can be of assistance.

I.A.R.U. REGAINS I.T.U. OBSERVER STATUS

For many years, I.A.R.U. has been on a list of organisations permitted to send observers to International Telecommunication Union conferences without financial contributions to expenses of the meetings. At the I.T.U. convention held in Moutreux in 1965, there was adopted a Resolution No. 16 which instructed the Administrative Council of I.T.U. to review the list of international organisations exempt from all contributions. This resolution was adopted because it was felt that the number of international organisations who were permitted to participate in I.T.U. meetings without making any financial contribution had grown too large. This instruction was carried out by the Administrative Council in 1966, when it reduced by half the number of exempt organisations. The International Amateur Radio Union was one of those removed from the list.

Recently, I.A.R.U. Headquarters, with the assistance of a number of member societies, requested re-consideration by the Administrative Council of our status as an observer organisation at international conferences. We are happy to report that this request has been approved, and the observer status of I.A.R.U. has been re-instated on the list of those exempt from financial contributions. (It is interesting to note that the resolution for exemption was moved by the Australian Delegate.—Fed. Sec.)

FREQUENCY MANAGEMENT SEMINAR

Biennially the International Frequency Registration Board of the International Telecommunication Union holds a frequency management seminar at its headquarters in Geneva, Switzerland. This year's seminar is to be held from 7th to 18th September, and as in past years I.A.R.U. Headquarters will be represented by WILKIE.

The Frequency Management Seminar is aimed at assisting administrations, particularly in the developing countries, more efficiently to manage their use of the radio frequency spectrum. Thus, a good opportunity is provided for representatives of the Amateur Service to meet with telecommunications delegates from other countries for the purpose of increasing the awareness of the values of the Amateur Radio Service.

1970 SUMMARY OF ANNUAL REPORTS

The accompanying table presents a summary of the information provided in your 1970 annual reports. Where an annual report was not received for 1970, information from the latest report received is provided.

REGION II. MEETING

Fifteen national Amateur organisations of North and South America represented by twenty-two delegates and observers, participated in the 1970 triennial Conference of the Union Interamericana de Radioaficionados—I.A.R.U. Region II, May 18-22, in Jamaica. The host society was the Jamaican Amateur Radio Association; during the week, a conference station with the special call GY0UR was in operation and made hundreds of contacts.

In opening remarks, I.A.R.U. President, WILKIE, emphasised the importance of Amateur preparation for the 1971 World Administrative Radio Conference on Space. He pointed out that in the same manner that organised radio has protected its h.f. assignments in the past, it must now work for the protection of our interests in the higher frequency and their use with space techniques.

The Caribbean Emergency Net has been a major accomplishment of the Region II organisation. This operation functions under the expert guidance of XE1AX and GY3EK. It was decided that expansion will be undertaken to cover portions of South America.

Slight amendments were made in the "gentlemen's agreement" plan for use of frequencies. This basic band plan now provides that 3500-3510 and 3780-3800 KHz. be used only for international DX contacts, that i.r.t.y. should use 4000-4100, and that 4100-500 as well as 21240-21250 should be reserved for DX work.

A contest sponsored by the Region II organisation has been attempted for the past two years. But, because interest was small, it has been decided to discontinue the activity and

study a possible alternative event to promote general Amateur interest in work of the region.

Finally, it was agreed to accept the proposal of the Radio Club de Chile to hold the 1973 Conference in that country.

EARTHQUAKE IN PERU

OAAA, the headquarters station of the Radio Club of Peru, performed outstanding service during June, handling emergency communications traffic resulting from the massive earthquake which devastated portions of Peru on May 31, 1970. OAAA was operated around the clock, largely on 7100 KHz., working other OA stations who were able to relay traffic from the areas of need.

This operation was observed first-hand by a representative of I.A.R.U. Headquarters. WILKIE spent two weeks in Peru during June as a member of the Andean Relief Mission, a group of mountain climbers and doctors who, organised under the auspices of the American Alpine Club, flew to Peru in order to render assistance. WILKIE set up OAA3 in a remote mountain area which had been hard hit, and handled a considerable amount of traffic between the Peruvian and the United States and Lima, thanks to the excellent assistance provided by OAAA. The Radio Club of Peru is to be congratulated for having organised this emergency communications activity in the finest tradition of the Amateur Service.

I.T.U. ANNOUNCES CONFERENCE DATES

The Administrative Council of the International Telecommunication Union has plans for holding the following conferences: The World Administrative Conference for space telecommunications scheduled to begin in June, 1971. The I.T.U. Plenipotentiary Conference will be held in Geneva, starting 14th September, 1973. The next World Administrative Radio Conference for maritime services will be held early in 1974. At the present time, no conference dealing with allocations throughout the h.f. spectrum has yet been scheduled.

★

GOING TO WASHINGTON?

The Foundation for Amateur Radio, Inc., a non-profit institution devoted to advancing the interests of Amateur Radio with its headquarters in Washington, D.C., announces the establishment by it of a Hospitality Committee with the objective of providing visiting foreign licensed Radio Amateurs with an opportunity to meet some of our local active Amateurs and, if desired, visit a local Amateur Station.

Any visiting foreign Amateur can get in touch with the Hospitality Group by calling (202) 893-8383. It will be appreciated if calls are made during the hours from 0800 to 2000 daily.

Arrangements can be made to greet the foreign visitor and to give him an introduction to our capital city as well as to Amateur Radio U.S. style.

★

WM. WILLIS MOVES

Established over 115 years ago, one of Melbourne's oldest firms, Wm. Willis & Co. Pty. Ltd., moved recently to 77 Canterbury Road, Canterbury, 3126. The new location will provide easy parking facilities and better service for customers. Manager Mr. Max Hull advised "A.R." that a change in the merchandising policy of the company was to develop a trend to fast and efficient mail-order despatch, and a general distribution of a special range of equipment and components of interest to Amateurs, in addition to its well known operation of manufacturing special components for the communications industry. The new telephone number is 836-0707, where Mr. Max Hull may be contacted during trading hours.

KW. ELECTRONICS KW2000B TRANSCEIVER

COVERS 10 TO 160 METRES

- ★ Six-band operation.
- ★ Lift-up inspection lid
- ★ Two-speed V.F.D. tuning.
- ★ Mechanical Filter provides pass-band for SSB.
- ★ No external antenna switching required.
- ★ Independent transmit and receive frequencies or true transceive operation.

- ★ 180 Watts P.E.P.
- ★ Matching A.C. power supply with built-in speaker.
- ★ Side Tone Monitor for CW.
- ★ Crystal controlled Receiver first mixer.
- ★ Output Impedance adjustable.
- ★ Easy to install in a vehicle for mobile operation.
- ★ Lightweight, attractive, robust and efficient.

Write for Technical Leaflet

Sole Australian Agent:

SIDEBAND RADIO

73 COLE STREET, ELWOOD, VIC., 3184

Phone 96-1877

Overseas Magazine Review

Compiled by Syd Clark, WK3AC

"BREAK-IN"

July 1978—

N.Z.A.R.T. Conference, Dunedin 1970, ZL4PG. According to the report every one enjoyed themselves.

A Two-Terminal Oscillator, ZL2AMJ. Two PETS in the equivalent of the old twin triode cathode coupled circuit. A very handy type of oscillator. Add your tuned circuit and you are "on frequency".

Some Observations of Mobile Antennas, by ZL2VN. VKs who are preparing themselves for some summer mobile operation should be interested. You cannot fit and forget a mobile whip. It must be tuned for optimum results. Digital Frequency Counter, Part 2, ZL3GDP. A four-digit counter using ICs. There is no reason for an Amateur to require more than four digits as he can display MHz., KHz., or Hz. as the need arises, knowing what is off-scale.

Olago Branch Project. S.S.B. Exciter, 9 MHz. Phasing Type, Part 3, ZL4LV.

"CQ"

June 1978—

Model Control by Radio, W2SI. This two-part article covers the history of radio control systems of models and the present day controls. Much of the early work done in the area was accomplished by Amateurs as the control system was operated in the old 3 metre band. Part 1 covers history and development, and Part 2 covers current day techniques and equipment.

The Two-Gallon Cavity, W2EAG. Hailed as the cure for six metre I.V.I. This article appears to be the only one which will be hailed by those who like to operate on six in Melbourne and Brisbane. The magic potion is two paint cans, two connectors, two juice cans and one small capacitor.

C.W. Spotting with the KWM-2, WB4JSV. Seems that someone has found a way of improving one of the best. The best today can always be bettered tomorrow.

The ARC-500 Linear, WA5UTP. He uses the case and the roller coil and fits in a power supply, three 6J5s and a pi network and the thing then runs 300 watts input.

An Eighty Metre Dipole, WB3GQY. This 20 metre dipole can fit in sixty five feet of space and will also load on 40, 20, 15 and 10 metres.

Variable A.F. Bandwidth for the HW-100, W2ZOL. Good c.w. mod.

Transistor Reverse Polarity Protection, Ronald L. Ives. The diode is a handy switching device.

A Receiver Audio Compressor, W1CEJ. A lazy man's gain control.

Convert S.W.R. into Watts, K5ZVR. Or turning the s.w.r. meter into a "thru-line" wattmeter.

Improved Performance from the No. 19 Set, W6JTT. The author converted a Number 19 Mark II. He claims excellent results on three bands.

Alfred Vail, the man behind the Morse Code, K2EEK. It would appear that many of the stories which now appear in the history books are heavily slanted in favour of those who held the power and are not necessarily correct.

This writer asserts that Morse managed to institute an indicator at a distance, but it was not until Vail happened along that he could send messages.

Could the Licensing System be used to Improve the Overall Performance of U.S. Amateurs, K4LIF. Obviously the title says what it means. I wonder though, whether the stops should really appear between the U and the S.

Calibrate Your Own D.C. Meters, K5STU. Part 2. Part 1 discussed the theory of the potentiometer and volt box. Part 2 covers the principles of the Standard Resistor, the construction techniques for all three units and their application.

CQ! Review the Heathkit 80-225 Linear Amplifier, W2AEF. If you are thinking of buying one you will be interested to see if you agree.

Surplus, The AN/PRC-10. Now some of the interesting units are appearing on the surplus market.

July/August 1978—

The very heading will give W2NSD/1 a thrill. So "CQ" have dropped to 11 issues instead of 12.

Transistorised Communications Receiver with Digital Frequency Read-out, PY2EC. From 1965 a receiver building programme commenced and some twenty-eight have been built. No. 28 is described.

Solid State Current Regulators, W4NVK. For those who need regulated voltages.

Something for Nothing C.W. Filter, W6IHP. Tune the primaries of two output transformers after removing the laminations from both of them and couple them electrically and you have a filter.

A Ten and Fifteen Metre Interaced Beam, W4AKZ. The title tells you.

Understanding Skin Effect, W4NVK. The cause and the results of skin effect. The coverage is non-mathematical and is ideal for novices, beginners of types from 15.

Model Control by Radio, W2SI, Part 2. Now the thing is proportional control. This allows precise control of the model and eliminates a lot of the violent actions which used to be inherent in model operation.

"CQ" Reviews the Hallcrafters SX-122 Receiver, W2AEF. Seems that even in these enlightened days much of the communications equipment made still uses those old fashioned, unreliable, heat producing valves.

A Two Metre Cavity Filter, W6QLB. This guy was not satisfied with one co-axial element, he had to put three trough lines in cascade.

"OHM," The Oriental Ham Magazine

This issue carries an exciting story about the search and rescue operation on behalf of the yacht "Exodus" 36 ft. long and carrying Jens Jensen, W4AMG/MG and his wife Kelko, Hams, Navy and R.A.F. were involved in the Gan area for 48 hours before the yacht was located and fuel supplied.

All-India Convention. A report on the activities in India and the manner in which the Indian Government is encouraging Amateur activity.

Mare in Asia, V5BDR. The story of the U.S. Military Affiliated Radio Service in operation in the Orient.

Tribute to a Veteran. Story of FLIHR.

Ham Profile, V5SEK.

Lincomex, V5BDD. A speech compressor is described which claims to have all the advantages and none of the disadvantages of the others.

"QST"

July 1978—

W7JK Five-Band Rotary Beam Antenna, by W7JK. Professor Kraus has taken one of his classic designs and by putting two vertically polarized units together, made it into an all-band antenna.

The 70 Communicator, W1KLC. Updating a popular v.h.f. transceiver.

A Silicon Diode P.I.V. Checker, W4DID. A simple device which enables you to check surplus diodes for P.I.V. up to 2 kV. The thing that puzzles me is why the designer didn't use a Varicap on the input. Perhaps because he had the 40 v. pot on hand.

Power Line Interference, W4USQ. This article reviews the causes and characteristics of power line noise.

The Ultimate Transmatch, W1ICP. From 80 through 10 metres, co-ax. or balanced line, it matters not, this unit will match it.

Let's Talk Transistors, Part 9. Operating transistor circuits by R. E. Sindles.

Some practical audio amplifier circuits and a Flip-Flop are studied from the standpoint of overall circuit operation.

Helpful Experiment—1970, W1JF. What happens to radio signals during an eclipse?

The Solid State Receiver, W01YH. Design problems and their solutions for high performance.

Some Basics of Solid State Design, W1CEJ. A practical introduction to the three-legged devices.



DARWIN RADIO CLUB

With only a small membership—about 25—and therefore limited funds, this club has done wonders. It has its own premises at Lee Point in the old Fortress Area and is proud of being what is probably the only radio club in the world guarded by two six-inch Coast Defence guns. Years of unrelenting battle with officialdom was necessary to secure the lease and the 240 volts a.c. connected; also much work to clean out the mess left by vandals, paint the interior and install work benches. There is much more to be done—dismantling old gear and salvaging components, etc., and working bees are being organised.

The first meeting at Lee Point was held on 2nd August at the Clubroom—it turned out to be unconstitutional as that day was a holiday in Darwin, but much useful discussion took place. A fortnight before, the Clubroom had been "christened" with a very pleasant barbecue for members and their wives and the official call VK8DA used for many QSOs. Basil VK8BB joined his Trio transceiver and a main shift 20 metre dipole showed what a good location it is.

The meeting was slightly disturbed by carloads of lovers driving into the clearing and glaring balefully at the members before moving off. It is located slap bang in the middle of one of Darwin's favourite Tail Light Areas.

The club is almost ready to go with a solid state 52 MHz. beacon designed and built by the members. A small but enthusiastic bunch and any Amateurs visiting Darwin on the first Monday of the month will receive a warm welcome. Just don't get lost on the tracks out of the Point. You may never be found again. Phone Basil Brodick, VK8BB; Henry Anderson, VK8HA; or Doug McArthur, VK8KK. They will give directions.

HAND-CARVED CALL LETTER PLAQUES

In solid Philippine Monkey Pod Wood. A unique gift for yourself—or others!

Price, parcel post paid, AS\$9.75 plus local tax of approx. AS\$4

Allow 3 months for delivery. You pay local tax. Send postal money order or bank draft for AS\$9.75 to:—

REPUBLIC CRYSTAL LABS

Exporter of Philippine Handicrafts

P.O. Box 46, Makati Comm. Center, D-708, RIZAL, PHILIPPINES

If you need special Plaques with business names or family names, send us a sketch of your needs and we will quote post paid. Cut-out letters of wood for wall painting also available.

Plaque lengths: 5 letters 20", 6 letters 22"; letters about 5" high; width 8"; thickness 1".

P.O. Box 222, Penrith, N.S.W., 2750
(All times in GMT)

Once again a varied range of conditions for the month, with some of the best being found on 20 metres over the last few days of August. Latest sunspot forecast is 87 for September and 85 for October, with 109 for April being the latest confirmation.

A further comment re the station giving the call ZM7CA, giving ZL2ACI as his QSL manager. The operation is rather dubious, as ZL2ACI disclaims any association whatsoever in the matter and is most anxious that the DX fraternity be advised accordingly.

Regularly information comes to hand here about some new club or DX association, and were I to delve into the workings of them all, I would never get this page completed. However, I have been asked to mention one which I feel warrants some little coverage. It is the International DX Association, a body whose sole objective is to furnish Amateur equipment and information to DXers. The DX Association have been instrumental so far in having rights to many rare spots such as OH2BH, ZF, ST2SA, KX1MN, KZ2AF and ZM7. Officers are: President, J. J. K. O'Connell, 10000 Highway 2, of two dollars U.S. B. Kellam, 6536 Alvirde Dr., Ellicott City, Maryland, 21043, U.S.A., whom I presume is K3RLY, will make you a member on submission of your application. The net on 44218 at 2330z daily.

A fine year of operating by Peter ZM3GQ has resulted in him receiving his five-band D.X.C.C. from the A.R.R.L. He leaves ZL for a period of about 19 months which will be spent in London.

My thanks to Don AX3AKN for a very welcome list of QSL information which will be included at the end of this page. Don is flat out at the present moment, but still manages to put in an appearance on 21 and 28 c.w., also 1.8 c.w., where he has had several contacts into the U.S.A.

I understand that the African DX net has recently been activated with WB6UDC and K8ZPI as net control pending the re-erection of the WP2Z's antenna. The Long Is. DX Assn. mailing list mentions the fact that 5X5MP was in the first radio operation, and XTZ, TTs and TY2 stations will be in later net. There is no further information in relation to time and frequency for the net, and I would appreciate any word on this. The 5X5MP station, by the way, is Sverre, a YL, and her QSLs go to the home GTH LARNIL.

The operation from Andorra by C3ICY with eight ops. was due from Aug. 13 to 31; QSLs for this effort go to DL2LK, Wilfred Ahlborn, Hauptstr. 30, D-3401, Holtensen, Germany.

There have been some vague stories about the planned operation from CE0K and CE0Z, but the reliable Geoff Watts DX News Sheet states that CE3ZN Joaquin will join with Gus W4BPD in November working four days on San Felix, followed by six days from Juan Fernandez.

CR5SP from Sao Tome is on regularly at 1730z on 21248 KHz., listening 21289/290. A list is taken a little earlier by CR6CA. QSLs to Box 97, Sao Tome, P.W.A.

Recent operation by CR9AK, operator Reg, asks for his QSLs to go to CT1BH. I understand Reg, who is on a tour of the Orient, has permits for operation in VS5, 9N1 and possibly the Laccadives. Reg is VETIG.

At last somebody had had the foresight to organise the FB8WW, XX, YY and ZZ boys. They are now in a net every day at 2330z from Aug. 17, with lists being made up on 14218 at 2200-2230 for contacts the following evening. FB8YY is heard regularly here at around 1600z

From Comoro Is. we note that FH8CD has returned to France for the next two months, however FH8CY who is ex-TG8GL, is holding the fort, and appearing quite often on 21225 at 1700z. Little use for us at that time I guess.

Martinique has long since ceased to be a rare one, nevertheless he remains an interesting catch and can be found on 21290 at 1700z on schedule with W40PM Tuesday or Wednesday

each week. Once again, a bit early for VK. FM0XF is also on regularly and asks for QSLs to go via DL5RI, whose address is Pierre Guannel, 1 Berlin 32, Cite Berthezene 44/2, Kurt-Schumaker Damm, Germany.

Recent operation by FW8BO, Tom from Wallis Island, has been rather prolific. He is

often on 14187 or thereabouts at 0600z or later and he QSLs via FK8BO, Box 28, Noumea, New Caledonia.

GC3UJE, who has been operating this month and who has been heard in this country at around 0300z, is operating from Guernsey. His name is Brian and QSLs for him go to G3UJE.

A Japanese possession net is in operation on Saturdays at 2000-2100z on 14170. This will give information on future operations by the JDI stations and as many as possible will be in the net. Most of these chaps ask for QSLs to go via the J.A.R.L.

KH6GLU, Ed de Young, well known as net controller of the Pacific DX net, now has a new address which is 95213 Waimeli Place, Waipio, Hawaii, 96786. He is also QSL manager for ZK1AJ, FW8DY, VR3DY, KR6AP, ZK1MN, KX6BK and 5W1AF.

The recent operation to Swan Is. by K5QHS was successful and all QSLs are to go to his home address, Box 588, Stuttgart, Arkansas, U.S.A. The other operation by W4VPD terminated in a hurry when the final blow

The following stations are active from the MP4 call areas. From Bahrain, MP4BHK and BIJ, from Qatar we have MP4QBK, his manager is W4MQG, whilst from Trucial Oman MP4TDI and TDA are holding the fort.

There seems to be a lot of criticism on the current operation by Gus Browning, both over the air and in the news sheets. Personally it does not affect me in the slightest, and if Gus doesn't stick to a tight schedule, that's his business and there must be a good reason for it. He is giving a good service to a lot of people who are interested in the legends of the bands. If I were looking for him I should imagine it would add a little interest to what has degenerated into a too well organised affair.

We still have a number of VR stations active. Bob VR1L is on from Ocean Is., QSL to W6NJV. KP6AL was expected to appear from VRJ Fanning Is. for a few days, while VR4CG is still holding the fort from the Solomons. His address is Box 310, Honiara, Solomon Is. VR2SA QRV Sept. 8 to 10 was a special Scout station from VR2EK. Another active from the Solomons is VR4BC, Box 332, Honiara.

Current operation from Cayman Is., due to cease Sept. 8, has a goal of several thousand QSOs. This is the jaunt by K9QZF and K9RJF, who were hoping for five-band operation. They ask for QSLs to Melvin Lehman, 3851 Albion, Lincolnwood, Ill., 50645, with SASE or SAE and IRC. The other two operations were K2OLS using the call ZF1AA, and ZF1GC operation, whose QSLs go to VE4XN.

L.I.D.X.A. bulletin states that ZS2MI on Marion Is. has shut down with equipment trouble and estimates that there will be no further activity from there until May of next year.

The new prefixes for the Mauritius area are 3B6 Algalea, 3B7 St. Brandon, 3B8 Mauritius, 3B9 Rodriguez. 3B7DA on St. Brandon is active and QSLs go to Meteorology Station Mauritius, while 3B8CZ is active from Mauritius.

The station signing **FKKAA** with a resounding c.w. signal on 20 most afternoons at around 0600z is the Club station and is on the air daily in fact from 0800z to 1000z, although I often hear him earlier. His frequency is 14040, and address is Box 28, Noumea.

There is once again some activity from the Pelagic Is., two separate operations, the first being ITIAX/IL Frank, asks for QSLs to IIIJ, whilst the other group signing ILIGAI, ILIJT and ILILCK were ITIGAI, ITIJT and ILILCK from Lampedusa from Aug. 29 to Sept. 1. Their QSLs go to ITIGAI, Box 13, Noto, Sicily. The same group go to Pantelleria from Sept. 2 to 7.

King Hussein is still with us, usually around the 1700x to 1800x period, however JY2 who is said to be his XYL, Princess Muna, has now appeared on the scene having been reported in the YL s.s.b. net 14332 at 2300.

Look for LX1BW every week-end until the end of October on all bands. There is no QSL info to hand, but I heard him at 0700z on 20 s.s.b. recently. During the week-end of Sept. 3 to 7 he will be signing F0YT.

MIB is still on the air and has a regular period of operation at 1300z and 1600z Saturdays on 21380 when QSL manager Mary WA-3HUP MCs the operation. I have heard several reports that QSLs have not been forthcoming.

The recent operation by Bob and Gary from the VP2 call area has been completed with over 6,300 QSOs in the log. The QSL'ing is going to be difficult and they ask that the following arrangements be observed. VP2DAJ, VP2LY, VP2SN and 8Y4RK contacts go to VE3EJW, whilst those for VP2DAE, VP2LC/P, VP2SM and 8Y4VE go to VE3GCO, with a separate SAE and IRC for each contact.

A particular request for those sending out QSLs for Dick VQ9HJB. Send them to H. J. Best, Box 2950, Luanda, Angola, P.W.A., but please do not put any call sign on the envelope.

A few more words about recent and projected operation from Albania. Firstly, the OH2BH/ZL trip held recently has now been finalised, and the A.R.R.L. have okayed it. Over 800 contacts were made with 52 countries in the 84-hour operation, and special cards were issued to all stations who worked the trip. There is a good chance that Martti will return there next June, meanwhile DLFT and VY hold reciprocal licences OE1ZLC and ZLA, and were trying to make arrangements to operate from Albania Sept. 22 to 25. ZA1C was heard on July 10 was allegedly a W1RE.

Once again, there are more new prefixes added than can shake the proverbial "tree." The following are some of the new News-sheet reveals the following: 4N2KP was Kolocep is 4N2LO was Lopud is QSL to 4N2LQ was LAM recently used call 4N2L for some obscure island. It is IP has been previously mentioned on this page as was FMH. ITSEIZU JL was from Ustjica, and is valid for all of Europe. I have also seen it used wherever that may be. FBBC/CN counts as CN0 for prefix hunters. HG100UA/E, the Lenin State Radio Club, is a station which is available from regions indicated by the suffix, QSLing to HA bureau. KP0NEB is the Nebraska State Amateur Radio Club. This is a station which we HKs under a contest prefix. Still they come, PA6E and PA9 were QRV mid July from the Pacific Northwest. They were heard via the buru whilst PA7TK took us to D1GTS.

Still on prefixes, O189UF from Aug. 5-9 was from a Scout camp in Lapland. Q5L to either the OH buro or OH2BHU, Bob Ahinas, Ferns, Finland. The final one is CB, several of these were used by OA stations to commemorate Peru's 140th anniversary of Independence. Maybe there is still another, yes, 4M0A from Los Monges, where that one is I don't know, other than that it is in South America.

Prior to the recent DX-peditions, 144 of the world's top DX men submitted lists of their most wanted countries. Since the lists were forwarded, there has been activity from Albania which is 3rd on the most wanted list, Palmyra 26th, Voticia Rep. 36th, Geyser Bank 39th, Serbia 43rd, Kuril Is. 43rd, Blenheim Reef 51st. The most wanted ten were in order of need, Clipperton, Laccadive, ZA Bouvet, Maria Theresa, XU, St. Sandwich, BY, Spratley Is., YI, AC4 and #25.

Finally, I have a few notes here for the S.W.I.s. Firstly, Jock White has mailed me over three awards for the S.W.I. section of the last VK-ZL Contest. They are for the VK2/4- and 5- winners, Steve Ruediger and myself collected the VK2 and VK5 section respectively, but the VK4 winner was B. C. Clark. L4144, and if that good fellow would forward me his address I will mail his certificate on.

Another item of very definite interest, but mainly to S.w.I.s, is an item in Motor re the handling of S.w.I. QSLs for certain DX stations. Rainer Kramer, DL7LV, is the QSL manager for S.w.I.'s only for the following countries:

DL7LV, DL7VLA, DL7NE, EA6AR, EA8AS, EA9AA, F0EUD, F0FNB
KZ5CB, HS3RB, KH6QGQ, K17BBX, KR6JT

Rainer Kramer, 1 Berlin 49, Alt-Lichtenrade 53, West Germany.

DL7LV, DL7VLA, DL7NE, EA6AR, EA8AS, EA9AA, F0EUD, F0FNB
KZ5CB, HS3RB, KH6QGQ, K17BBX, KR6JT

KZ5CB, HS3RB, OTZTUJ, OY2A, TAZAE, TP3ST
TP3TE, TU2AY, TU2UZ, TZUBB, WAUAF/KH3C
WU2R, ZL3EZ, YPBRZWD, ZA1XX

Other QSO information will again have to be held over until next month. However, before I close this page, there is one small point to be made across this week when looking around the band. I have noticed that there is one who may own a Trio 8R0DE receiver. This is a general coverage rx, with bandwidth on the order of 100 kHz. The frequency dial is located on range C, and the bandwidth dial is calibrated to match this range. However, 20 also appears on band D, which is the range that I am using. I am not sure if it is to be used on this range and has no corresponding bandwidth. Try setting your bandwidth selector to your selector on range D, and you will find 20. I am not sure if this is a main dial. You will then be able to use your bandwidth by turning it clockwise, and get the best performance. I am not sure if this is as well as getting a far better performance from the receiver. In a check a few minutes ago, I started to move the bandwidth from 20 to 100 kHz. I was just about to do this when the time I reached the end of the bandwidth. I had not reached the American phone band, but I was in the bandwidth plus a vastly improved performance.

That's all for this month, thanks to Don AX3AKN, George ZM2AFZ, Geoff Watts DX News Sheet, Long Is. DX Assn., Monitor, plus the I.S.W.L. news staff, and Mac Hilliard, 73, and good DX from Don, 1-2022.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

"SOMETHING TO CONTRIBUTE"

Editor "A.R." Dear Sir,

I note with interest the concern being shown by your section of the Amateur fraternity at the possibility of us losing some more of our frequencies.

Can we not justify the holding of four megahertz in the two metre band or thirty megahertz in the 70 cm. band, or even for that matter two megahertz in the six metre band.

If we use modern narrow band channels, all the activity in any v.h.f. band could be accommodated in 300 kilohertz and the two metre f.m. activity could be restricted to spot frequencies. The remainder of the two metre band could then be allocated for commercial mobile users who have a much better claim to the space. The same comments can be made about six metres.

The 70 cm. band needs to be able to accommodate a couple of TV channels for those who wish to view the national and regional news. It may not be so much demand for this portion of the spectrum by other users.

As for the h.f. bands, the less said the better. If I may quote from the International Radio Regulations, etc., as found in the handbook, paragraph—

"The licensee of an Amateur Station shall use his licensed equipment without pecuniary gain and solely for the purpose of investigation or research into, or instruction in, wireless telegraphy."

Assuming that the term "wireless telegraphy" means some form of broadcast, in my broad sense, I would defy 90 per cent. of the operators on any band at the present time, to justify their existence at all. From this point of view, the amateur radio hobby, as it is, does not deserve it and it is a pity that commercials haven't been strong enough at the conference table for this h.f. band, the less said the better.

It isn't good enough any longer, just to get on the air for the sake of enjoying oneself. As Amateurs we ought to be doing a lot more to demonstrate that we are worth the space we do indeed have something worthwhile to contribute—sometimes I doubt it.

—David D. Tanner, VK8AU.

BETTER USE OF MOBILE SERVICE SPECTRUM

Editor "A.R." Dear Sir,

I would like to dissent with a line of arguing in the "Amateur Radio" and many if not all, publications in the field. These follow the common theme that there is high pressure on spectrum space, particularly v.h.f. and if we won't use it we shall lose the space we have. This is exactly the theme I would plant into these publications if I was a public relations man trying to manoeuvre the use of acquiring this space for another purpose.

You seem to follow the tradition of use or lose. Some alternative approach must be presented for your consideration. We are in the situation of a person with property in the path of development and wish to retain that property. Wish alone will not be enough.

Conservation—a political watchword for the coming decades—is one idea that he can put which will carry weight in political circles.

Historical evidence of conservation, and again rising in strength as an argument in these days of asking: "Is the development worth the price?"

Surely the conservation parallel is evident by comparison with land use. The freeways of mobile radio and the drive-in theatres of the television channels are obvious. The conservation of the countryside is the provision of that area for its enjoyment as itself, conservative values are obvious. The conservation of space for its enjoyment as itself, the Amateur bands being a National Park of the spectrum.

The historic value angle has been pursued in the past and is still as valid as ever, although probably less powerful politically.

And the "outgrowth" of "progress" can use is that his all is only a small fraction of big brother's total; how about big brother improving his modus operandi, to not need the extra space. This argument need not be put very subtly, preferably by insiders in big brothers camp. Let us look at what we have and what we want. The extra space in the extra tv. channel gained if we lost all the 90 and 144 MHz. bands, aeronautical services have their share, and only one strong pressure remains the mobile radio use. Mobile radio

is run in a fashion which is inherently wasteful of space, by a system comparable with party lines for telephoning work.

Here we are looking at big brother's space requirements and, noting that the pressure on mobile radio services is such that if our v.h.f. bands were fed to the mobile radio users they would only last a few years before their pressures were back to the same level.

The answer would seem to be—find a method of solving the mobile services dilemma, and make it one that pleases the three primary parties, and the pressure can be relieved from the v.h.f. bands.

The effective channel occupancy of mobile radio services is generally considered to be of one channel per service is the crux of the problem. Either time or frequency division multiple access systems are required to give the answer. The mobile radio spectrum could be cut into, say, 50 channel slabs with each user, mobile to base or base to mobile, capturing a transmitter frequency slot or time slot for each contact.

The mobile unit would require that its receiver listen to a control channel and on call be tuned to the allotted traffic slot automatically.

Back to the interested parties. Users would have less trouble with nuisance from other users. They would have to buy a new set, but with ICs the costs would not be excessive, and replacement at the end of a system's useful life could be arranged.

Equipment manufacturers would welcome the extra market the scheme would bring—lots more cars using mobile radio services would be usurped. There would be fewer crystal problems since the synthesizers would be similar for all users, only a block of spectrum.

Whilst questioning this scheme, it is as well to note that a synthesizer using only two integrated circuits has been built.

The P.M.G. Department is a very important power in this proposition. Do not know their wishes, but they would have a powerful and long lasting series of decisions to make. Frequency allocation, time slot, control channel, users, private ownership, or P.M.G. ownership of master stations? One format or many? These problems would be solved if the will was there, and Amateurs (possibly in their professions) should be sowing the seeds now.

Summing up, more cogent arguments, better use of the mobile service spectrum and, still very important, the v.h.f. bands—all of them, not just one channel.

—Tom Berg, VK2ZAF.

Reference—Editorial: "Wasteland Revisited", Electronic Design, 14 November 1968, p. 51. Discussing television and CATV, it takes a reference to television spectrum use as "a vast wasteland" and television executive's assessment of that statement as a "conservative estimate". Later it describes (American, but isn't ours largely American?) television channels as "ambient, electronic air pollution".

CAN WE AFFORD NOT TO HAVE AN INSTITUTE

Editor "A.R." Dear Sir,

Your editorial last month is commendable, and although my experience of Federal affairs has been limited in the last year, I would see as an "ex officio officer," in a position to see what was, even then, an intolerable situation.

I have no wish to amplify your remarks except to say that I am sure that the Institute has refrained from mentioning the EXTENT of the time that you and others expend in these honoraria. However, it is a fact that the press concern at the fact that Federal Councilors appear to be grossly conservative, or alternatively, unwilling to put the issues strongly at variance with the status quo. I am sure, by the Council's apparent reluctance to face the situation and to sacrifice themselves a little appears at variance with the status quo. I am sure that work done by Executive as described in the Presidential reports.

Amateur Radio in this country enjoys a status, a set of privileges, and operating conditions equal to or better than anything else in the world. They have been achieved in the face of a strong and growing status quo. I am sure, by a Federal Executive prepared to spend long hours at much personal sacrifice. What keeps them from being an unimaginative Council is beyond me, but it does seem that the Council has a certain spirit lacking elsewhere.

Of course the answer to the question you raise is that the Institute has a certain show is, it must be faced. The justification for extra money is based on two clearly defined truths.

1. The Institute has reached a stage of development where a large number of its activities cannot be tolerated. With commitments locally and internationally—Australia, I.T.U., C.I.B., and origin—a relaxing of the executive effort will put in poor light with

overseas societies, not to mention the Post Office.

2. With resignations, retirements or, what is worse, just a plain lack of interest, such a decline may occur. My observation of up and coming youth shows reluctance to become involved in institute administration. To do so anyway would be to perpetuate an anomaly within the context and conditions of this argument.

Sir, this is 1970; we must not wholly depend on the pioneering spirit of the nineteen Twenties and thirties. The future of the Institute in a large country and whether we like it or not, our progress is such that we must keep up with modern techniques.

If this Federal Council is not prepared to ask for, and the members to give, an extra few dollars a year, then their salvation is not in Amateur Radio, or the Institute.

Perhaps they might find it in a game of tennis.

—T. E. Straughair.

PHOTOGRAPH IDENTIFIED

Editor "A.R." Dear Sir,

It was my pleasure to receive copies of your August issue from two friends, both directing my attention to page 6. The page 6 picture was actually that of the Exhibition Committee Radio Club, which was held in 1967 under the auspices of the Wireless Institute, N.S.W. It was not the management committee of the Institute.

Those in the picture: No. 9 was Sid Colville and front row No. 2 was Mr. Hungerford, of Western Electric (now S.T.C.).

No. 3 was Treasurer of the W.I.A. (N.S.W.) at the time and suggested the Exhibition, and undertook to organise the industry to support it. He was one of the few who saw the W.I.A. finished up with over £800 net profit, pretty good for a first effort.

During the 60 years of W.I.A. activity it has posed a huge issue from the nation and to thousands as a pleasurable hobby.

With best wishes for every success to A.R.

—O. Mingay.

R.D. CONTEST

Editor "A.R." Dear Sir,

Regarding the Remembrance Day Contest, I feel there should be more incentive for operators to use the c.w. mode, as compared to the phone mode operation, in both the c.w. and open sections.

More time is required using c.w. to complete the contest. And the fact that the number of c.w. operators active in the contest, more time is used in finding contacts.

At present an operator who wishes to contest is at a high price as possible for the Division, in the time has available for the contest, has more opportunity by using the transmitting Phone Section, rather than the transmitting c.w. mode.

Considering the Open Section, an operator who uses the phone mode for the majority of the contest can gain more points than the operator who shares his time evenly with both modes.

Perhaps if a multiplier could be applied to the points obtained using the c.w. mode of operation, the percentage of c.w. operators would not be so small.

I have included these comments with my log for 1970 R.D. Contest which has just returned to the Contest Manager, and thought that you may wish to publish them in "A.R."

—J. E. Loftus, VK3QK.

"PIN MONEY" FOR A SIDELINE

Editor "A.R." Dear Sir,

On 6th August last on the 20 mx band a station in a common European country, but outside the UK and WPA only was going through the dog-pile that was calling him as fast as possible.

In an hour he worked 40 routine stations and was still going. His QSO routine went like this: "RST, C, 59, 9, 14, 3, 2, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 14

ample because the sad truth is that too many don't understand the ethics of QSLing in the Amateur Service—or do not want to—and are simply out to exploit their call and make a fast buck, i.e. petty shamsatourism.

—Alan Shawsmith, VK4SS.

LECTURE ARTICLES

Editor "A.R.," Dear Sir,
As a reader of your publication "Amateur Radio," I feel that attention must be drawn to a series of articles designed to guide Amateurs in the use of the Radio Shack watt-hour meter, written by C. A. Cullinan, VK3AXU.

I refer firstly to Lecture No. 6 which appears in the now current August issue, for it was this article that compelled me to write this. I must voice my disapproval at the way Mr. Cullinan describes the action of power in an a.c. generator.

On page 23 following "Comment: In a perfect a.c. generator . . ." Mr. Cullinan says that the voltage and current are exactly in phase in the above described generator. Surely for any current to flow at all, whether it be in-phase or any other phase angle to the generator voltage, there must be a resistance in the circuit connected to complete the circuit. For the described criterion of in-phase voltage and current to exist with the perfect generator, the load must be a resistor, i.e. have unity power factor.

I believe that in the case of a perfect a.c. generator the phase angle of the current is wholly dependent on the power factor of the load. When any generator feeds any load, the resultant phase angle is a function of the generator's internal impedance and the load impedance.

The situation occurs exactly where the generator feeds a load and a resistor in series of equivalent capacity in series with a resistor. At a particular frequency, namely the resonant frequency of the circuit, the voltage and current have two reactive terms can vectorially sum to zero and all the volt-amps, produced by the generator are dissipated in the load and hence unity power factor. The error in the above statement, Mr. Cullinan's statement "A good knowledge of the meaning of Phase is essential for an understanding of the action of power in a generator," is true, but so inconsistent with his explanations.

Further on under the same heading "Comment," there is discussion of a watt-hour meter. Mr. Cullinan says that "the watt-hour meter is the only instrument which measures the power you pay for," and further on "But, if the load contains reactance, you do not get a useful result from all the billing." These statements convey the impression to me that the watt-hour is not sensitive to power factor, and that the watt-hour meter does not read zero power factor, i.e. a capacitor was to be connected to it.

It appears that Mr. Cullinan thinks a watt-hour meter measures "active power." While this term is not necessarily misleading, the modern terminology of it is volt-amps. This is a figure calculated by multiplying the applied voltage by the current flowing. In fact a watt-hour meter does not necessarily measure volt-amps, but measures exactly what its name implies, the product of power (watts) and time (hours). Power is calculated by the product of applied voltage, current flowing and the power factor.

Since watt-hour meters are adjusted to give a zero reading within prescribed defined limits when a specified load of zero power factor is connected to it.

All this means in short is that a consumer may connect a load to his power outlet that consumes, say, 1,000 volt-amps, at 250 volts, supply voltage, is 250 volts, a current of 4 amps, will flow. If the load is a perfect capacitor, the consumer will not get charged for the power consumed by his watt-hour meter will register.

Noted under the next "Comment" in the article that the "1942 watts of power" (I think the writer means 11942 watts) are paid for but not used. "I think my above discussion shows this not to be so. I stress again that the watt-hour meter does not give any extra for using equipment that has a power factor other than unity. However, since there is an inherent loss in the line in supplying a load of low power factor, there will be more voltage dropped in the line. If the consumer loses at all it is in the line, i.e. he has to pay for the loss from his power meter are not as low in resistance as they might be, he will suffer a loss of voltage arriving at his load, and he will have to be charged any more than the actual energy consumed in his circuit.

The next point in the article concerning the reduction in rates if a large consumer corrects his power factor, I feel is worth commenting on. I do not know this fact to be true but believe it to be true. The power authorities will actually the power authorities who will lose

by supplying power to a consumer who has a power factor that is not unity.

Since for a given amount of power consumed there is a loss in the line, the power factor, for the same power, will be a minimum only when the load has unity power factor. As the power factor decreases, the line current increases, which will inherently cause a larger voltage drop in the transmission lines between the power station and the load. This voltage drop constitutes a power loss, and a further loss of impedance is mainly resistive at power frequencies. Thus the power authorities have to generate more power than they can actually sell to the consumer to overcome the losses incurred in transit. It is obvious that these losses will depend upon the power factor of the load. Power loss will be a minimum only when the load has unity power factor. Thus it is not surprising that the power authorities will give more power to a consumer who corrects his power factor towards unity. This above explanation, I think, clarifies Mr. Cullinan's statement that "the clear public demand is to unity power factor, the less useless power has to be generated". The useless power being that which is dissipated in the power lines.

I notice Mr. Cullinan's statement on top of page 23 concerning accuracy. "The student should calculate all the data above to at least four decimal places, and then round off to three significant figures since the ridiculous condition could exist where an answer may take the form of, e.g. 8530.736, which is not a realistic accuracy. A fundamental law says that the number of significant figures in an answer derived from the product of two numbers cannot exceed the minimum number stated in the given data. A far more practical approach would be, e.g. 8530 watts, to show the accuracy of the answer. The general maximum resolution of a slide rule is three significant figures and logarithms four significant figures." I think that the above statement is better than above would normally mean a long-hand calculation which can be a waste of good time which is, in my experience, the case of a good power factor correction. The accuracy of the given data would have to be assumed to be at least four significant figures, and the result rounded off to three significant figures, which is normal practice.

The above discussion is illustrated in the answer to part (a). Mr. Cullinan takes at least four steps of calculation to arrive at the answer which I will show is incorrect due to inaccuracies compounded in the calculation.

My approach to this part of the question would be to determine the actual wattful power in the circuit. We know from a previous part of the question that the current flowing is 17.07 amps. (correct to 4 sig. figs.). The only element in the circuit which can dissipate power is the watt-hour meter, which has the 17.07 amps. passing through it. Hence we can calculate the power in it as follows:

Power equals current squared multiplied by resistance.
equals 17.07 squared multiplied by 25.
equals 7276 watts (4 sig. figs.).

We can see a discrepancy of about 80 watts from Mr. Cullinan's answer. This method required only one mathematical manipulation to arrive at the answer and thus no approximations or rounding off. The angle of 15.39 degrees angle magnitude from tangent tables and then finding the cosine of the angle again from trig. tables, an error was introduced as 1 watt.

Power equals wattful power divided by reactive power,

equals 7276 divided by 8530,
equals 8.530 (4 sig. figs.).

We have a discrepancy of 0.007 in the cosine of the phase angle which is enough to give a different mathematical angle. The final result of Mr. Cullinan's calculation in this section is that the error in power is approximately 0.83% high and the phase angle 1.5% low.

The errors accumulated early in the calculation when the phase angle was initially found from a tangent relationship. I agree that the cosine of 15.39 degrees is 0.9639 (4 sig. figs.), but the value of tan phase angle equals 0.6110 (4 sig. figs.). From tangent tables the cosine of 15.39 degrees is 0.9639 (4 sig. figs.). Hence power equals 8530 x 0.9639, equals 8214 (4 sig. figs.).

In the above problem, all intermediate answers had to be kept accurate to at least 4 sig. figs. so that the final answer be accurate to 3 sig. figs. The final angle was 15.39 degrees, trig. functions to 4 sig. figs. is quite a lot of bother but was quite necessary in this case to justify the answer. Mr. Cullinan's answer of 7338.8 watts appears to be found as a result of correcting an answer of tan phase angle to one significant figure, i.e. tan phase angle was 0.6, and the cosine was expressed with 5 sig. figs. Note here also that

Mr. Cullinan's earlier requirement for 4 decimal places to be used in the impedance calculation were obviously considered not warranted in this subsequent calculation.

I feel that by publishing answers to problems of this nature to accuracies that are quite inconsistent with methods of computation available to the student, even when the answers happen to be arithmetically correct to 5 sig. figs., is often misleading. A case like this is when a student may spend much wasted time in attempting to correct the answer to verify his technique when, for some obscure reason, that particular method may only yield an answer to 3 sig. figs. with normal computation methods.

It is my opinion that the second half of lecture No. 6 is plagued with quite misleading basic ideas which places the potential harm to the student in a very serious position. An examination which will be assessed by a person in the P.M.G. whose basic ideas are based on much firm ground. Propagation of such fallacies at such a basic level to a student coming to grips with these principles for the first time will ultimately lead to failure. If per chance he scrapes through this exam, we have scored one more misguided Ham.

My sentiments concerning Lecture 6 prompted me to browse over Lecture 8. I wonder if Mr. Cullinan's definition of the term "r.m.s. value," abbreviated "r.m.s."? At the end of the article, Mr. Cullinan says that "When dealing with a.c. quantities, i.e. motors and the like, it should be remembered that voltages are quoted on an average figure. It may be of interest, that Mr. Cullinan knows that the average value of any symmetrical voltage or current waveform is strictly zero provided there is no d.c. off-set present. Its r.m.s. or effective value is, however, a factor of 0.707 of its peak value. This r.m.s. value is the magnitude of equivalent a.c. that will produce the same heating effect as the same magnitude of d.c. when each in turn is passed through or placed across a resistor.

The term "average value" is reserved for another application where it is defined as being 0.636 of the a.c. peak value. This application refers to each half cycle in turn of a waveform. The average value of 0.707 of its peak value of equivalent a.c. that will produce the same magnetic field as the same magnitude of d.c. when each in turn is passed through or placed across a resistor. The average value of a sine wave flux-producing coil, bearing in mind that the flux will change direction each half cycle.

This "average value" finds application particularly in rectifier type moving coil a.c. meters. The waveform of the input wave is a full wave rectified version of the input waveform. The meter reads as though d.c. were being measured. The average value of the meter current (d.c. component) equals 0.636 x a.c. peak current. However, the meter multipliers and shunts are adjusted so that the scale reads the true r.m.s. value. For a pure sine wave the difference is about 11%, i.e. meter is corrected by 11%. It is important to note that a moving coil rectifier a.c. meter only reads the correct effective or r.m.s. value for the case of a pure sine wave. When measuring other types of waveforms, allowances must be made if the correct answer is to be found.

All waveforms have a figure which will indicate the type of correction required. It is called the form factor, and is the r.m.s. value to the average value. For a sine wave the form factor is 1.11.

I hope that my comments may assist in the presentation of the forthcoming books in the most recent lectures of this series of articles and that whether they are used in full or in part for publication, may assist newcomers into the technical world of the technical mysteries of electronics.

—G. N. Twining, VK5ZTE.



1970 TAB BOOKS ISSUED BY TAB BOOKS

TAB Books, Blue Ridge Summit, Pa., 17214, U.S.A., publishers of the famed Gernsback library books, has just released its spring 1970 catalogue. Describing over 125 current and forthcoming books, the TAB Books catalogue covers the following subject areas: Schematic/servicing manuals, broadcasting, basic technical, electronic, and radio-related engineering, reference, television, radio and electronics servicing, audio and hi-fi, hobby and experiment, test instruments and trainers. The first two and forthcoming titles featured are: "How to Repair Home and Auto Air Conditioners," "Small Appliance Repair Guide," and "MagnaVox Color T.V. Service Manual." The catalogue is available free upon request.

All things in order

[illegible]

VK3 is certainly going all out at present to enthruse as many operators as possible towards Field Day operation. Following is a list of current dates, each being a Sunday, and oper-

9/8--Almost completed contact with VK8AU 2150-2159. Nothing from Adelaide. Between 2223 and 2247 I sent VK8AU 3/3 and received 4/4 and then both confirmed these reports via meteor scatter, both stations on s.s.b. and 52015 KHz. It has since been reported one burst of VK5ZWW heard in VK8AU in Darwin.

10/11/26--Received reports 3/4, 2/2 and 3/3 from VK8AU and sent 3/4, 3/3 and 3/3. Also identified VK5ZDX, VK5ZDY and VK5QZ from Adelaide, sent reports to each but no replies.

Conditions on the next evening were better and whole words and call signs were received over and over again, culminating in two-way (continued on page 25)

VK3 V.H.F. PRE-AMPS.

Now available, a new improved V.H.F. Pre-Amplifier featuring lower noise, higher gain, diode protection in case of reverse polarity connection. This Pre-Amp uses the new T1S89/25N245 field effect transistor.

Available ex stock

\$6.00 incl. postage and packing.

Order from: DISPOSALS COMMITTEE
P.O. BOX 36,
EAST MELBOURNE,
VIC., 3002.

Also available ex stock:

432 MHz. Converters \$22.00

144 MHz. Converters \$13.50

Write to above address for complete price list for the above and other components.

COMING SHORTLY

A NEW SIX METRE CONVERTER AND A 1296 MHz. CONVERTER

For further details contact the Victorian Division Disposals Committee advertisements in "Amateur Radio".

CHANGE OF ADDRESS

WILLIAM WILLIS & CO. PTY. LTD.

is now situated at

77 Canterbury Rd., Canterbury, Vic.
Phone 836-0707

Correspondence: C/o. Post Office, Canterbury, 3126

V.K. ELECTRONICS

63 HAROLD ST., DIANELLA, W.A., 6062

Service to Transceivers, Receivers,
Transmitters, Antennas, etc.

Phone 76-2319

REPAIRS TO RECEIVERS, TRANSMITTERS

Constructing and testing: xtal conv.,
any frequency; Q5-ers, R9-ers, and
transistorised equipment.

ECCELESTON ELECTRONICS

146a Cotham Rd., Kew, Vic. Ph. 80-3777

KITS

FM IF STRIP (ref. "A.R." June '70), \$9.80.
Wired and tested, \$12.80.

CF4555 CERAMIC FILTER, optional for
above, 16 kHz. bandwidth, \$16.00.

1W. IC AUDIO AMP. (ref. "A.R." July '70),
\$8.40. Wired and tested, \$11.40.

VARACTOR MULTIPLIER KIT, 144 to 432
MHz., diode not supplied, \$8.00.

2N3632 TRANSISTOR (unbranded). May be
used as v.h.f. amp. or varactor, \$7.00.

PS805 RECTIFIER FILTER KIT, 25V. d.c. max.,
2A. max., \$3.75. Wired and tested, \$4.25.

REDUX VOLTAGE REGULATOR, 4.5-18.5V. d.c.,
reg. max. 0.2A. max., \$9.85. Wired and
tested, \$11.90.

All prices include sales tax and postage.

COMMELEC INDUSTRIES

P.O. BOX 1, KEW, VIC., 3101

Phone (a.h.) 80-2937 or 277-8205

N.S.W. Rep.: J. W. Rufus, 9 Bridge Road,
Homebush, 2140. Phone (a.h.) 76-7133.

SILENT KEYS

It is with deep regret that we
record the passing of—

VK2JZ—Alec Mather.
VK2LS—Lionel Todd.
VK6CP—Clarrie Cooke.
VK6LU—Lou Stagg.

VHF NOTES

(continued from page 24)

reports being exchanged 5 x 4 for the 1190 miles. These have been confirmed by QSLs. Congratulations Bob and David for a fine effort. Bob is now in the course of constructing a high power linear for his s.w.b. exciter, and together with thoughts of a 9 element beam on the north looks like really getting into the fray: around the end of the year will be looking for stations 560 to 1300 miles distant to the north and west. To the east the Mt. Lofty Ranges present an obstacle, but may be worth considering anyway.

So there we are chaps. Main requirements for worthwhile participation seem to be at least 100 watts of a.m., preferably s.s.b. to the legal limit, a 9 element or more antenna, ability to read out your frequency to 200-300 cycles and stay there, low noise converter with stable tunable i.f., someone at the other end to keep

skeds with you, plenty of patience, and your just rewards may be quite surprising. If you can run to high power c.w. you may even do better. Good luck.

Doug is operational on 32 and 144 MHz., and 432 MHz. receive only. On 32 MHz. he uses both s.s.b. and c.w., running 200 watts p.e.p. to a pair 6146Bs with a 9 element wide spaced 35' boom Yagi. Yagi up 100 ft. He also uses an FET front end and 28 MHz. tunable i.f. On 144 MHz. he again uses s.s.b. and c.w., but his work is severely limited by location. Antenna is a 12-tube helix to 60-W4 converter. Similar converter is used on 432 MHz. He also operates on the 146 MHz. f.m. net.

The areas worked on 52 MHz. read almost like the pages of a call book, being VK1, VK2, VK3, VK4, VK5, VK6, VK7, VK8, VK9 Zaglav, VK3 New Guinea (counting as two countries), ZL1, ZL2, ZL3, ZL4, W6, V66, HA, 9M2, KW6, K6G6, DUL, G16, K6R6, K6R6, and all JA districts! Total of 14 countries and on my calculations 34 call areas at least! A very outstanding effort Doug. Fitted in with all such things as FT-DX-400, and KWM-1, etc., on 80 to 10 metres. Looking to the future, Doug wants to continue looking for multipliers on 52 MHz., and further scatter experiments.

Looks like I shall have to conclude these notes at this point. I hope as many of you as possible will write to me about doings of yours on 52 MHz. Your areas, this is the only way the page can be kept going satisfactorily, and with the coming DX season hope to hear from many correspondents.

Thought for the month: "The easiest way to teach children the value of money is to borrow it from them!" 73, Eric VK3LP, The Voice in the Mills.

HAMADS

Minimum \$1 for forty words.
Extra words, 3 cents each.

HAMADS WILL NOT BE PUBLISHED UNLESS
ACCOMPANIED BY REMITTANCE.

Advertisements under this heading will be accepted only from Amateurs and S.W.'s. The Publishers reserve the right to reject any advertising which, in their opinion, is of a commercial nature. Copy must be received at P.O. 36, East Melbourne, Vic., 3002, by 5th of the month and remittance must accompany the advertisement.

FOR SALE: From the estate of Alex Mather, VK2JZ, one of Australia's leading DX men. Heathkit SB100 transceiver with external VFO, power supply and handbook, \$400. 1 professionally built copy of Heathkit SB600 Linear, pair 5728s in final, fully metered, fan cooled, with in-built power supply, \$300. 1 professionally built copy of the Swan 240 transceiver with speaker and power supply, \$200.

Drake 2B Converter, \$225. 40 ft. Antenna Tower, prop. pitch motor, 20 metre quad, direction indicator, power supply, antenna tuning unit, 5 position 100 ohm antenna switch, 160 watt filter and SWR meter with all cables and co-ax., dismantle and remove at own expense, \$125 o.n.o. 1 30 ft. crank-up Tower with 10 and 15 metre quad with all cables, co-ax. and antenna rotator and indicator, dismantle and remove at own expense, \$100. SSB Modulation Monitor with external SPI CR0 tube and screen, \$20. 1 portable SSB Modulation Monitor with 1 inch CR0 tube, \$15. 1 50 ohm 30 watt Dummy Load with thermocouple anemometer, \$15. 1 RF Indicator fitted with Palec 50 uA. meter, \$5. Capacitor Checker, \$10. 1 5 MHz. 2A.VA Crystal Filter complete with matching USF/LSB carrier crystals. 88 Complete sets "A.R.", "CQ" and "DS" What offers? 1 Smiths Electric Clock, \$10. 1 pair of Akai Headphones, \$5. 1 Yaesu Musem Verrier Dial, \$8. P.A. Equipment: 2 20 watt Sound Control, 600 ohm line, 200 watts, 1 A.W.A. 80 watt Amplifier, multi-taps on output, \$50. 1 10 watt Amplifier, \$10. 1 A.W.A. 15 watt Amplifier, \$20. 1 A.W.A. AC/DC Amplifier, 5 watts, \$15. 1 A.W.A. AC/DC Amplifier, 10 watts, \$12. 2 15 watt 16 ohm Driver Units, \$30 each. 5 Resonator Driver Units, 10 units, including 600 ohm line to VFO transmitters, \$30. 1 Microphone Loud Hailer, \$10. 5 6-ft. Horns, \$15 each. 3 2-ft. Reflex Horns, \$10 each. 1 15-inch Reflex Horn, \$8. Sundry Microphones, Extension Cables, etc. Firm written offer only to Mrs. G. Mather, 14 William St., Singleton, N.S.W.

FOR SALE: HRO Receiver with pwr. sup. but no speaker, \$80 or offer. Bendix Frequency Meter 14-10 CR7423B with modules for calibration box and pwr. sup. \$30 or offer. Write VK3AXO, J. Dunne, P.O. Box 165, Tatura, Vic., 3616.

FOR SALE: Hy-Gain 4 element 6 meter Beam, \$30; Dow-Kay Co-ax. Relay, 12v., \$10; Range of Eddy-stone Condensers; AC2500B and air socket, \$20; 4 x 4 ft. Hi-Voltage Power Transformers and Chokes, all above new in boxes. Pye T.V. Camera with 2 lens, less vidicon, \$48. Send for complete list of V.F.O. Tuning Condensers and Trimmers, \$2.50. C. James, VK5KA, 10 Broadway, Glenelg, S.A., 5045. Phone 960-9438 after 5.30 p.m.

FOR SALE: W.F.S. 500 12v. Transistor Power Supply for Swan 350 or 500 Transceivers for operation on Swan or similar unit at full power input ready to plug into any Swan unit. \$55. A.W.A. MR10 F.M. Converter for use as a base converted with coils for Channel B but less power supply, write for full details, \$18. Ian McCosker, P.O. Box 299, Moore, N.S.W., 2400. Phone 52-2600.

FOR SALE: 60 ft. crank-up tilt over Tower. Guyed top section, self supporting if only used to 40 ft. Four years old, \$150. J. A. Ferguson, 204 Plenty Rd., East Preston, Vic., 3072. Phone 478-3575.

KW2000 90w. p.e.p. Top to Ten Transceiver. Offers to VK3BAE, 14/10 Daley St., Elwood, Vic.

SELL: 12-15v. 300w. Petrol Electric Generating Set, \$425. Transceiver, 630v. 500 mA. (2), \$2.50. 2,000v. 500 mA., \$10.50. 450v. 250 mA. 6.3v. 3A. 5.3v. 1A. 5v. 3A. 600v. 250 mA. \$4.50. U.H.F. 144 MHz. 100 watt Base Unit, 16/1000, \$100. 1 converted, \$32; Pye Base Station, converted \$3.1 (leas tx transport); 300 Pye Rotorator MK IIIA, converted \$3.1; 512 (Leas crystals); Gelloso 4/104 V.F.O. Tuning Condenser and Trimmers, \$2.50. C. James, VK5KA, 10 Broadway, Glenelg, S.A., 5045. Phone 95-2569.

WANTED: Collins 325-3 Transmitter. Details and price to VK3CZG, 2 Kalmia Ave. Mt. Waverley, Vic., 3149. Telephone 277-4798 (Melb.).

WANTED in good condition, 3 or 5-band commercial S.S.B. Transceiver, trap vertical antenna 14AWQ and automatic frequency inspection in southern States early October. Prices and particulars to D. Macaulay, 25 Parkmore St., Bوندall, O.V., 4034.

WANTED TO BUY: AR7 Receiver in original condition, can be less coils and power supply. "Amateur Radio" and "Radio" magazines, 1963, 1964, August 1963, Colin Gracie, Cavendish Post Office, Vic., 3406.

WANTED TO BUY: Star ST-700 Transmitter in any condition. Must have handbook. All replies answered S. King, VK3VDC, 1 Kalmia Ave. Mt. Waverley, Vic., 3149. Phone 659-2921 (a.h.), 277-4748 (a.h.).

SIDE BAND ELECTRONICS ENGINEERING

Prices below, subject to alteration without prior notice, are all for equipment, directly imported from the various factories, in stock all the time, no use to advertise otherwise:

YAESU MUSEN

FT-101 latest AC/DC all-band Transceiver, one demo. model available.
 FT-DX-400 de Luxe Transceiver, 500w. PEP, AC supply built in \$325
 FT-DX-400 Transmitter, 300w. PEP, AC supply built in \$350
 FR-DX-400 de Luxe Receiver, 160 to 10 metre Ham bands \$375
 FR-DX-400 super de Luxe model Receiver with all the available accessories built in, 500 Hz. CW filter, FM filter and FM discriminator and 2 and 6 metre solid state Converters \$475
 FT-200 economy Transceiver, with extra heavy duty AC power supply-speaker unit for 230-240-250v., adjustable \$410
 FL-DX-2000 Linear Amplifier, built-in AC supply and SWR meter \$325
 FL-2000B Linear Amplifier, with extra heavy duty AC power supply-speaker unit for 230-240-250v., adjustable \$375
 5 or 2 m solid state Converters, 10 m output, as used in the FR-DX-400 super de Luxe Receiver \$325
 FF-30-DX Low Pass Co-ax. Line Filter \$15
 500 Hz. CW Filter Kit, as used in the latest FT-DX-400 Transceiver \$35
 FV-DX-400 External VFO for the FT-DX-400 and FT-DX-100 Transceiver \$80

SWAN

SW350C Transceiver with AC supply-speaker unit \$550
 SW350C with Swan 14-230 AC/DC power supply unit \$600

HY-GAIN

Hy-Qud, triband cubical Quad, 10-15-20 mx. one co-ax. feedline \$130
 TH6DX tri-band senior Beam, 10-15-20 mx. 1KW. AM \$220
 TH3JR tri-band junior Beam, 10-15-20 mx. 600w. PEP \$120
 14AVU 10 to 40 mx four-band Vertical, 1KW AM \$52
 18AVU 10 to 80 mx five-band Vertical, 1 KW AM \$85

MOSLEY

TAS3JR tri-band 10-15-20 mx junior Beam, 600w. PEP \$105

NEWTRONICS

4-5TV 10 to 40 mx four-band Vertical \$60

CRYSTALS FT-241 series, chan. 9-79, full box from 375 to 515 KHz. Individual channels, 20c to 82, depending on frequency. \$15

MOBILE WHIPS

WEBSTER Bandsman, 10 - 80 mx centre-loaded, continually adjust. \$55
 MARK HW-40 Helical Whip for 40 mx. \$20; HW-3 10-15-20 Helical, \$35
 Swivel Mount and Spring for flat surface mounting The Pair \$10

ROTATORS

CDR Ham-M heavy duty Rotator with indicator-control unit, for up to 2 inch masts, the proven Amateur Rotator since 1955 \$165
 Eight conductor cable for same, per Yard 60c

ANTENNA NOISE BRIDGE

OMEGA TE-7-01 Bridge, for the serious antenna experimenter, gives resonance and impedance in one operation \$25

BALUNs, exact elect. duplicate of the Hy-Gain BN-86, locally made \$12.50
 FILTERS: KOKUSAI Mechanical Type, 500 Hz. CW pass band \$20

MIDLAND Products

27 MHz. ONE WATT hand-held Transceivers, three channels available, tone call signal for CW operation, battery voltage meter, audio squelch, with batteries, carrying case and strap, earpiece, P.M.G. approved type, with crystals for 27.240 MHz. operation under P.M.C. licence per unit \$37.50

SWR and Power Meter, with two meters to read forward and reflected waves simultaneously. 52 ohm impedance, 2 kw. power \$20
 Field Strength Meter, 5-band 1 to 300 MHz. telecop. whip, earpiece \$10
 Mobile type PTT Dynamic Microphone, coiled cord, plug, high limped. \$10
 More MIDLAND Products expected, desk microphones, with and without built-in pre-amplifiers, co-ax. connectors.

CO-AX CABLE: All 32 ohm type, prices per foot, any lengths: 3/16 inch diam. Type RG-58-U, 10c; 3/8 inch diam. type RG-8-U, 20c; 3/8 inch diam. Type RG-214-U, silvered shield and inn. conduct., 30c

TRANSFORMERS: Still certain types of NATIONAL Transformers and Chokes in stock at give-away prices, ask for list and literature and pictures of all the above goodies. Sales tax included in all prices but postage, freight, insurance or registration are extras!!

SIDE BAND ELECTRONICS ENGINEERING

P.O. BOX 23, SPRINGWOOD, N.S.W., 2777

Proprietor: ARIE BLES

Telephone (STD 047) Springwood 511-394, not part of the Sydney telephone exchange, in the Blue Mountains 50 miles West of the Big Smoke.

DURALUMIN ALUMINIUM ALLOY TUBING

IDEAL FOR BEAM AERIALS AND T.V.

★ LIGHT ★ STRONG
 ★ NON-CORROSIVE

Stocks now available for Immediate Delivery

ALL DIAMETERS — 1/4" TO 3"

Price List on Request

STOCKISTS OF SHEETS—
 ALL SIZES AND GAUGES

GUNNERSSEN ALLEN METALS

PTY. LTD.

SALMON STREET,
 PORT MELB'NE, VIC.
 Phone 64-3351 (10 lines)
 Telegrams: "Metals" Melb.

HANSON ROAD,
 WINGFIELD, S.A.

Phone 45-6021 (4 lines)
 Telegrams: "Metals" Adel.

BRIGHT STAR CRYSTALS

FOR ACCURACY, STABILITY, ACTIVITY AND OUTPUT

SPECIAL OFFER—

STANDARD AMATEUR CRYSTALS

TYPE HC6U HOLDER, FREQUENCY RANGE 6 TO 15 MHz.

0.01% \$4.25

0.005% \$5.50

Prices include Sales Tax and Postage

COMMERCIAL CRYSTALS

IN HC6U HOLDER, 0.005% TOLERANCE, FREQUENCY RANGE 6 TO 15 MHz.

\$6.00 plus Sales Tax and Postage

Write for list of other tolerances and frequencies available.
 COMPREHENSIVE PRICE LIST NOW AVAILABLE—WRITE FOR YOUR COPY
 New Zealand Representatives: Messrs. Carrell & Carrell, Box 2102, Auckland
 Contractors to Federal and State Government Departments

BRIGHT STAR RADIO

LOT 6, EILEEN ROAD, CLAYTON, VIC., 3168 Phone 546-5076

With the co-operation of our overseas associates our crystal manufacturing methods are the latest



professional or amateur... chart your course to varian/eimac for dependable, high quality power tubes

EIMAC TUBE TYPE	CLASS OF OPERATION SERVICE	TYPICAL OPERATION — SINGLE TUBE								FLUOREN- T VOLT- AMPERES
		D.C. PLATE VOLTAGE	D.C. PLATE CURRENT (AMPERES)	D.C. SCREEN VOLTAGE	D.C. GRID VOLTAGE	APPLIED MAX. DRIVE POWER (WATTS)	APPLIED D.C. SCREEN CURRENT (AMPERES)	APPLIED D.C. GRID CURRENT (AMPERES)	APPLIED MAX. POWER OUTPUT (WATTS)	
3-400Z	B SSB	3000	.100 .333 ⁽¹⁾	—	0	32	—	.12	655	5.0 14.5
	B SSB	3000	.240 .670 ⁽²⁾	—	0	65	—	.30	1360	7.5 21.3
4CX250B ⁽¹⁾	AB1/SSB	2000	.17/.25 ⁽³⁾	350	—55 ⁽⁴⁾	0	0/.005 ⁽⁵⁾	0	300	6.0 2.5
	C/CW	2000	.25	250	—90	2.9	.019	.026	390	
	C/AM	1500	.20	250	—100	1.7	.02	.014	235	
4CX300A	AB1/SSB	2500 ⁽⁶⁾	.17/.25 ⁽³⁾	350	—55 ⁽⁴⁾	0	0/.004	0	400	6.0 2.5
	C/CW	2500 ⁽⁶⁾	.25	250	—90	2.8	.016	.025	500	
	C/AM	1500	.20	250	—100	1.7	.02	.014	235	
4CX1000A	AB1/SSB	3000	.25/.90 ⁽⁴⁾	325	—60 ⁽⁴⁾	0	—0.02/.035	0	1680	6.0 10.5
	AB1/SSB	3000	.015/.065 ⁽⁵⁾	360	—85 ⁽⁴⁾	0	0/.006	0	130	6.0 3.5
4-65A	C/CW	3000	.112	250	—105	1.6	.022	.009	270	
	C/AM	2500	.102	250	—150	3.1	.026	.013	210	
	AB1/SSB	3000	.03/.105 ⁽⁵⁾	510	—95 ⁽⁴⁾	0	0/.006	0	200	
4-125A	B/SSB ⁽¹⁾	3000	.02/.115 ⁽³⁾	0	0	16	0/.03	0/.055	240	5.0 6.5
	C/CW	3000	.167	350	—150	2.5	.03	.009	375	
	C/AM	2500	.152	350	—210	3.3	.03	.009	300	
4-250A	AB1/SSB	3000	.055/.21	600	—110 ⁽⁴⁾	0	0/.012	0	400	5.0 14.5
	C/CW	3000	.345	500	—180	2.6	.06	.01	800	
	C/AM	3000	.225	400	—310	3.2	.03	.009	510	
4-400A	AB1/SSB	3000	.09/.30 ⁽³⁾	810	—140 ⁽⁴⁾	0	0/.018	0	500	5.0 14.5
	B/SSB ⁽¹⁾	3000	.07/.30 ⁽³⁾	0	0	40	0/.055	0/.10	520	
	C/CW	3000	.35	500	—220	6.1	.046	.019	800	
4-1000A	C/AM	3000	.275	500	—220	3.5	.026	.012	630	
	AB1/SSB	4000	.17/.48 ⁽³⁾	1000	—130 ⁽⁴⁾	0	0/.04	0	1130	
	B/SSB ⁽¹⁾	4000	.12/.67 ⁽³⁾	0	0	105	0/.06	0/.15	1870	7.5 21.0
3CX100A5	C/CW	4000	.70	500	—150	12	.137	.039	2100	
	C/AM	4000	.60	500	—200	11	.132	.033	1910	
	C/CW ⁽¹⁾	800	.08	—	—20	6	—	.03	27	6.3 1.2
2C38A	C/AM ⁽¹⁾	600	.065	—	—16	5	—	.035	16	

⁽¹⁾ Ratings also apply to 4X250B.

⁽²⁾ Ratings apply to 4-250A within plate dissipation limitation.

⁽³⁾ Zero signal and maximum signal dc current.

⁽⁴⁾ Grid and screen grounded, cathode driven.

⁽⁵⁾ Adjust to give stated zero-signal plate current.

⁽⁶⁾ For operation below 250 Mc only.

⁽⁷⁾ At 500 Mc.

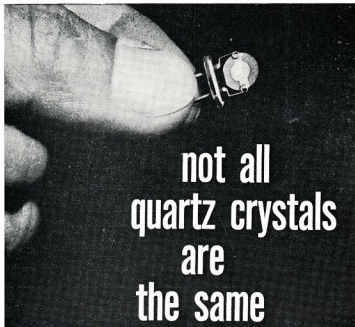
Above you see popular Eimac tube types suitable for professional and ham transmitters. Remember this chart when you need a tube. And remember the name Eimac. It means power. Quality. Dependability. For Eimac has more know-how, more experience with power tubes than any other manufacturer. For further

information you are invited to contact our offices at the addresses shown below.



varian PTY LTD
electron tube and device group

38 oxley street/crows nest/nsw 2055/43 0673
678 springvale rd/north springvale/vic 3171/560 6211
338 coronation drive/toowong/qld 4065/721 3277
10 stirling highway/medlands/wa 6009/86 6930



not all
quartz crystals
are
the same

Today's sophisticated communications equipment calls for crystals that meet the most exacting standards of the art.

Standards that were acceptable a few years ago cannot meet the requirements of design engineers today. Today's tight tolerances demand quartz blanks with precision selected angles of cut, and Hy-Q use X-ray diffraction equipment to determine this most important factor.

Long term stability is assured by close engineering control of all processing in an air-conditioned environment. The blanks are then checked to determine the frequency change over the temperature range.

The crystal is then precision calibrated to frequency using a crystal impedance meter which simulates the manufacturer's oscillator specifications.

Hy-Q crystals are custom manufactured to meet all these exacting requirements.

It is for these reasons that Hy-Q crystals have been readily accepted as a standard by the Communications Industry and why we can guarantee them against defective material and workmanship or any deterioration in performance when they are used in equipment for which they were specifically made.

Australia's largest independent crystal manufacturers.

Write for details.

Hy-Q Electronics Pty. Ltd.

AGENTS:

NSW: General Equipments Pty. Ltd.,
Artarmon. Phone: 439 2705.

SA: General Equipments Pty. Ltd.,
Norwood. Phone: 85 4844.

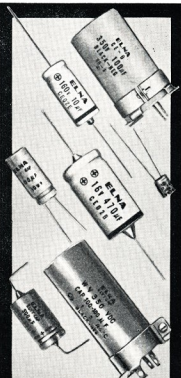
WA: Associated Electronic
Services Pty. Ltd.,
Morley. Phone: 76 3858.

NT: Combined Electronics Pty. Ltd.,
Darwin. Phone: 6661.

TAS: Hobart Radio Clinic,
Hobart. Phone: 34 5884.

QLD: Douglas Electronics Pty. Ltd.,
322 Old Cleveland Rd.,
Coorparoo. Phone: 97 8222.

10-12 Rosella Street,
P.O. BOX 256,
Frankston, Victoria, 3199.
Telephone 783 9611.
Area Code 03.
Cables: Hyque Melbourne.
Telex 31630.



every month
45,000,000

ELNA

Electrolytic Capacitors are wired into quality equipment throughout the world... proof that ELNA capacitors are fully accepted and wanted by manufacturers everywhere.

Catalogue now available

**SOANAR
ELECTRONICS
Pty. Ltd.**



VIC.: 30-32 Lexton Rd., Box Hill,
89 0238.

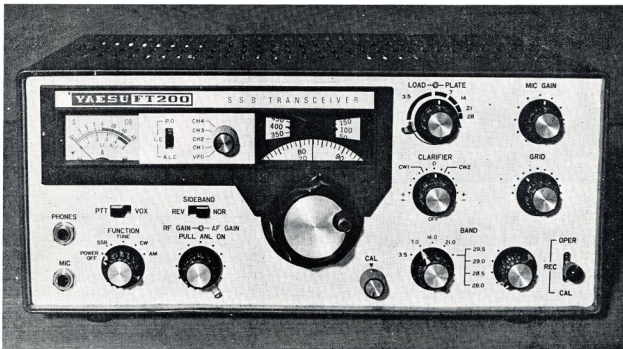
NSW: 82 Carlton Cr., Summer Hill,
788 6999.

QLD: R. A. Venn Pty. Ltd., Valley,
51 5421.

SA: A & R — Soanar Group, 470
Morphett St., Adelaide, 51 6981.

WA: Everett Agency Pty. Ltd., West
Leederville, 8 4137.

Sole Australian Agents



ECONOMICAL SSB!

from YAESU

FT-200 FIVE-BAND TRANSCEIVER

A superb quality, low cost, versatile transceiver. Covers 80-10 mx, tuning range 500 Kc. each band. On 10 mx, crystal supplied for 28.5-29 Mc. (Crystals available optional extra for full 10 mx coverage.) SSB, CW, AM; with a speech peak input of 300w. Transistorised VFO, voltage regulator, and calibrator. 16 valves, 12 diodes, 6 transistors. PA two 6JS6A pentodes. ALC, AGC, ANL, PTT and VOX. Calibrated metering for PA cathode current, relative power output, and receiver S units. Offset tuning ± 5 Kc. Uses a 9 Mc. crystal filter with bandwidth of 2.3 Kc. at -40 db. Selectable sidebands, carrier suppression better than -40 db. Sideband suppression better than -50 db. Fixed channel facility optional extra, useful for net operation, skeds, etc.

Other well known Yaesu Models: FT-101 Transistorised Transceiver, FTDX-400 Transceiver, FL-2000B Linear Amplifier, FLDX-400 Transmitter, FRDX-400 Receiver, FTV-650 6 Metre Transverter, FF-500X Low Pass Filter, 600 c.p.s. CW Mech. Filter for FRDX-400, 600 c.p.s. CW Crystal Filter for FTDX-400. Also: SWR Meters, Co-ax. Switches, F.S. Meters, Co-ax. Connectors, Hy-Gain (U.S.A.) Beams, Antenna Rotators, Electronic Keyers, Co-ax. Cable.

All sets checked before despatch. After-sales service, spares availability, 90-day warranty. All Yaesu sets sold by us are complete with plugs, power cables and English language instruction manual. Prices and specifications subject to change.

Sole Australian Agent:

BAIL ELECTRONIC SERVICES

N.S.W. Rep.: **MOSMAN RADIO SERVICES**, P.O. Box 56, Mascot, N.S.W., 2020.
South Aust. Rep.: **FARMERS RADIO PTY. LTD.**, 257 Angus St., Adelaide, S.A., 5000.
Western Aust. Rep.: **H. R. PRIDE**, 26 Lockhart Street, Como, W.A., 6152.

60 Shannon St., Box Hill North,
Vic., 3129. Phone 89-2213

Telephone 67-1650
Telephone 23-1268
Telephone 60-4379

Operates from conservatively rated separate 230 volt 50 c.p.s. AC power supply, FP-200, which includes built-in speaker. A 12 volt DC power supply, DC-200, is also available. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet finished in communication grey lacquer. Panel, etched, satin finish aluminium.

Price, FT-200, \$350 inc. S.T.

Imported Yaesu matching Power Supplies:

FP-200 \$90 including Sales Tax
DC-200 \$120 " " "

New shipment! Ample stocks for immediate delivery.

radioparts

PROPRIETARY LIMITED

CUSTOMER SERVICE



Available NOW! SEMICONDUCTOR CATALOGUE

Write or phone for our New Semiconductor short form Catalogue, incorporating devices from:

TEXAS INSTRUMENTS
FAIRCHILD
PHILIPS
ANODEON
MULLARD
DELCO
R.C.A.
S.T.C.
SIEMENS
GENERAL ELECTRIC
INTERNATIONAL RECTIFIERS
NATIONAL SEMICONDUCTORS

CALL IN AND SEE
THE WIDE RANGE OF
R.F. AND OTHER
TEST EQUIPMENT



radio parts

GROUP

562 Spencer St., Melbourne, Vic., 3000. Phone 329-7888, Orders 30-2224
City Depot: 157 Elizabeth Street, Melbourne, Vic., 3000. Phone 67-2699
Southern Depot: 1103 Dandenong Rd., East Malvern, Vic., 3145. Ph. 211-6921

OPEN SATURDAY MORNINGS!